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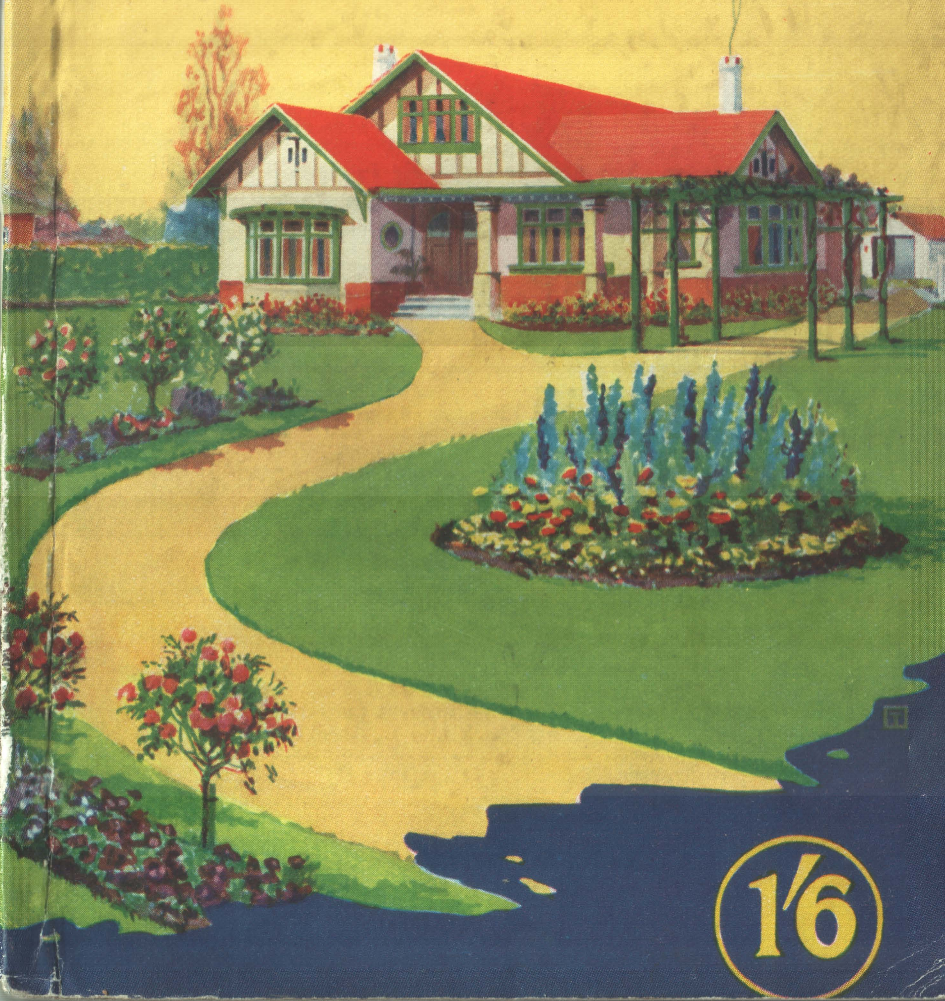
GARDENING HANDBOOKS

Gardening
in AUSTRALIA



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A Palm Garden.

WHITCOMBE'S AUSTRALIAN GARDENING HANDBOOKS

Gardening in Australia

A Practical Guide to Laying Out and Cultivating Gardens; Lawns, Hedges, Paths; Diseases and Insect Pests; Propagation and Reproduction of Plants; Soil Preparation, etc., etc.

BY

EDWARD E. PESCOTT, F.L.S., F.R.H.S.

Author of "The Dahlia in Australia"
"Native Flowers of Victoria," &c.

Illustrated from photographs by the author and practical plans and diagrams.

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Gardening in Australia

CHAPTER I.

INTRODUCTION

As everyone knows, gardening is practically the same the wide world over. The same soils are found, and they are just as variable wherever you go. Digging and hoeing are the same in every land; planting and sowing are done in the same way; and the same kinds or varieties of plants are found or can be obtained in every country. Wild Roses from China, for instance, grow in England, America or Australia. But Australia is a vast country, the north is in the Tropics, and the south approaches the cold southern regions. There are the usual hills and mountains, plains and valleys; the so-called deserts are deserts only until water makes its advent there and, exerting its wonderful powers, virtually makes them blossom as the rose.

Open-air Gardening.

Though the principles of gardening then are the same, the practice is somewhat different. One great difference between Australian gardens and those of Great Britain is that here we can have our gardens full of flowers all the year round, in winter as well as in summer. Indeed, under some conditions the gardens are gayer in winter than in midsummer, and some gardeners find it easier to make a display of cut flowers in July than in December. Of course, all gardening in Australia is open air gardening; glass-houses are for the few. Generally speaking, only those who possess a gardening staff, or those who specialize, think of growing plants under glass.

Flowers all the Year Round.

We are indeed a fortunate people, to be so favored by Nature that we can have gay gardens all the year round. Thus a flower farm may be glorious with Daffodils in September, bright with Asters in February, and gay with Iceland Poppies in June and July; and so, as one season succeeds another, the glories come crowding thick and fast upon one another. Gladioli may flower all the year round. I remember one exhibitor who showed his

Gladioli spikes at one of our horticultural societies each month successively for nearly three years. Narcissus and Daffodils may be had in flower from May to December, according to variety. Lasiandras and Bougainvilleas are in flower for nine months of the year, and Dahlias bloom from December to May. Zonale Pelargoniums are in flower for the whole of the year.

Roses, too, will grow almost anywhere and everywhere in all parts of Australia. For months and months our gardens glow with the beauty and exhale the fragrance of the Rose. Teas and Hybrid Teas, Wichurianas and Pernetianas, and climbers of all kinds revel from August to May; and even some hardier varieties flower in the winter. Hybrid Perpetuals are not commonly grown, as they give few blooms and these chiefly in the spring.

Owing to the immense area of this continent, there is a great diversity of plant life, and considerable variety in garden work. In Queensland those gorgeous foliage plants, Crotons and Caladiums, are grown in the open, and epiphytal orchids and ferns are grown on the trees. In the south, the English Hawthorn, Lily of the Valley, and beautiful Laburnum adorn the gardens, while Rhododendrons and Azaleas are common in the cooler spots and aspects.

Garden Plants as Weeds.

The geniality of the climate and soil, and the wonderful adaptability of plants have led to many curious and interesting results. In some forest dells, the English Foxglove has become beautifully acclimatised. In others one may find the dainty

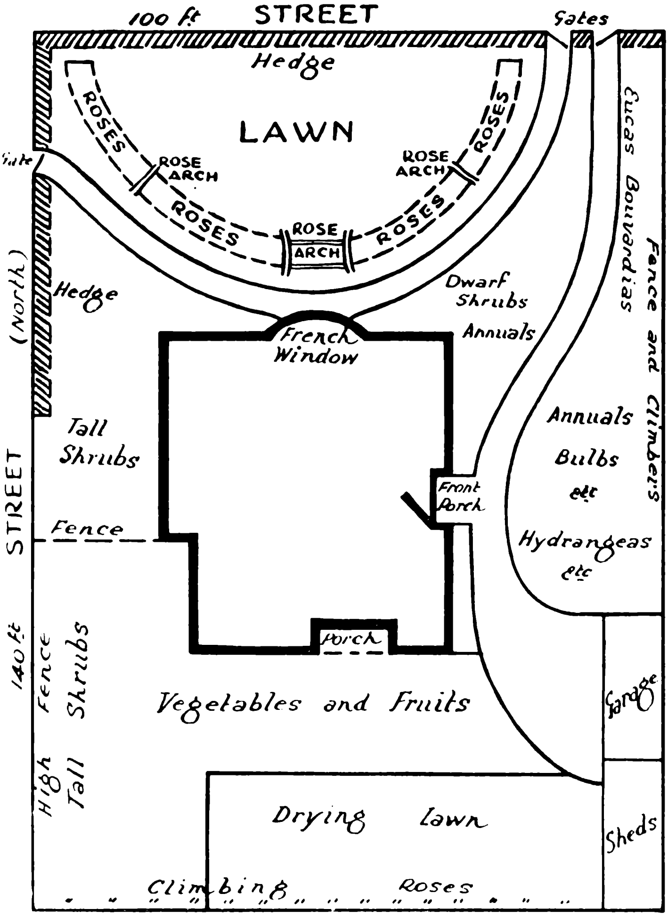
Lycopod, *Selaginella stolonifera,* creeping along the floor of the forest. In other places the Monterey Pine of California, *Pinus insignis,* is growing spontaneously, being naturalised from seed of cultivated trees. The perennial flowering habit of *Lantana trifolia* in all its varieties, from the West Indies, has made it a much-used garden shrub in the South, while in the north, the shrubs producing germinable seed in profusion have become an intolerable pest, quickly occupying acres and acres of the best land.

The little South African bulb, *Romulea rosea* (*R. cruciata*) which is grown as a pot-plant in England, has spread and increased to such an extent in many parts of Australia, that it is a genuine weed pest, occupying thousands of acres of good grass land. The Ox-eye Daisy, *Chrysanthemum leucanthemum,* which was first, and still is, grown as a dainty herbaceous garden plant, has also become a bad weed in many soils. Even the beautiful and fragrant Sweet Brier, which reminds our British-born people of the sweetness of the Homeland, is an intolerable pest in many places.

Herbaceous plants are popular, and largely grown; but the herbaceous border, as it is known in the colder lands, is almost unknown in Australia, where herbaceous plants are usually grown in mixed beds and borders, so that they may be lifted for the winter, without leaving too many gaps and bare places.

Australian Hybridisation.

Though we are a young nation, but a hundred odd years old, we are already skilful horticulturists, and



A Good Plan for a Home Garden

can hold our own even in plant-improvement and plant-hybridisation. This is not mere assertion, but is a statement founded on the following well-known facts. Wherever Chrysanthemums are grown, the name of Thomas Pockett, of Victoria, will be known. Pockett has worked on this flower for years, and produced by hybridisation many of the world's best exhibition Chrysanthemums. His plants are grown in almost every place in the world where this popular autumn flower is shown, and it is said that in America there are acres of his productions under cultivation for the cut-flower trade.

In the Daffodil world, Australia is coming into its own. Alister Clark and Leonard Buckland, both of Victoria, are producing some exquisite blooms. Buckland's "Militant," West's "Golden City," and Clark's "Nightlight," quite equal any of their class, while "Gertrude Nethercote" is perhaps the finest of all Jonquil hybrids. Some new Poetaz varieties, as yet unnamed, of the purest white and of fine substance, have been raised by W. E. Jones, of Victoria.

The Kerslake Carnations and Pentstemons, raised by the late G. H. Kerslake, of New South Wales, are among the first of their classes. His Gloxinia-flowered Pentstemons were a revelation to growers, the flowers and trusses being remarkably large and brilliant.

The crimson, scarlet and pink hybrid Watsonias, the hybrid Tree Dahlias, the fine Japanese Irises, and the herbaceous Hibiscus which have been raised at the Melbourne Botanic Gardens, are all fine examples of new colors and types of flowers. The late Mr. J. Cronin, formerly Director of the Gardens, was also responsible for many varieties of Cactus, Paeony, Collarette, Rosette, and other Dahlia types. Many other Dahlia workers all over the Commonwealth are producing equally fine results.

Gladiolus raisers are also at work with this charming plant, and results are equally good; for it is only necessary to mention such varieties as Fireflame, Saturn, Intensity, and Mrs. Rattray to show the standard to which these flowers have been raised here. The two yellow Gladioli, Goldmine and Standard Gold, raised by W. E. Jones, rival in colour any other yellow Gladiolus.

Mention must be made of the Webbley type of Ericas which were raised at Malvern, Victoria, many years ago. These are quite the best of any hybrid Ericas that have been grown, and they are of great value for the cut-flower trade.

Lastly, there is the queen of flowers, the Rose. We are indebted to R. G. Elliott's "Australasian Rose Book" for a list of nearly two dozen good Roses of Australian origin, now on the market. The list includes Roses of all classes: Teas, Hybrid Teas, Hybrid Perpetuals, Polyanthus and Wichurianas, all of which are excellent. It is interesting to note that the Climbing Maman Cochets, both white and pink, originated as sports in New South Wales.

Gardening always has been and always will be popular in Australia. The demand for flowers, seeds and plants, for gardening literature, and for information, and the success of horticultural societies and flower shows all prove this.

CHAPTER II.

GARDEN DESIGNING.

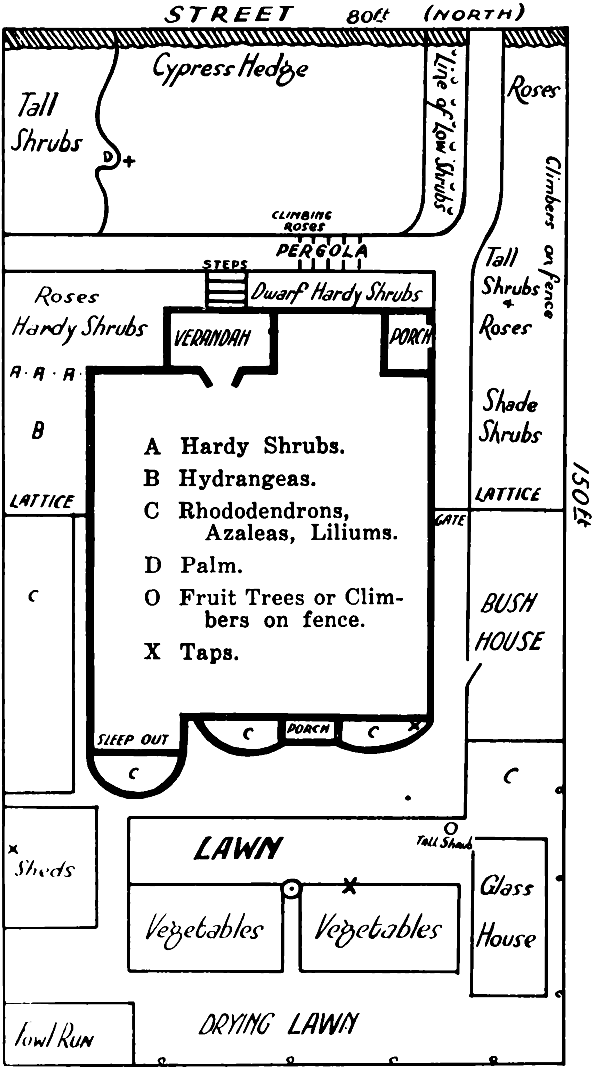
Landscape Gardening.

In designing the garden, the keynote right through should be simplicity. The term "Landscape Gardening" is one which is very commonly used, and sometimes perhaps not thoroughly understood. But the explanation lies in the name, viz., that the garden, whether large or small, should have a landscape or a natural appearance. The gardener's efforts, therefore, will be to reproduce as closely as possible the effects of Nature in his garden; therefore naturalness, combined with simplicity, should be the whole effort of the landscape gardener.

Landscape gardening is not prescribed in its meaning, and a small villa garden may be designed with landscape effects in much the same way that a large garden would be designed.

In laying out the garden, the first points of notice are the position of the house door, the verandah, and the windows, in relation to the gates and the street. The paths should generally be designed so that the front door is not visible from the gate. Then the front door may be left open and the passer-by is unable to see inside.

If a hedge be planted, complete obscurity for the house itself is provided. If there be no hedge, the provision of an evergreen shrub or palm between



A More Elaborate Design

the fence and the door will be a necessary feature. The latter is important in those cases, now becoming popular, when fences are dispensed with.

Garden Paths.

The first essential in regard to garden paths is that they should be as few as possible. Where the garden design is cut up by intersecting paths, the plan is apt to show somewhat of a gridiron or a chess-board effect, and so ceases to be true landscape gardening. More lawns or more gardens and less paths should be the rule in designing.

Again, straight paths are better avoided, but occasional straight paths, where directness is required, are frequently necessary. Then, when the paths cross, they should not bi-sect at right-angles, but all bi-sections or path meetings should be designed with even and open curves. In all gardens, whether large or small, the sweep of the path should be graceful. Curves with wide diameters rather than narrow are to be favored, and gardeners should avoid having any curves in the path that will have the appearance of a wobbly snake track.

Designing.

There are two methods of mathematically designing the sweep or curve of a garden path. The first is shown in Diagram 1, in which the path is composed of two opposite quadrants of a circle, drawn on two squares, placed corner to corner.

In a very large garden, a curve designed in this way would not be objectionable, but in a small garden the diameters of these curves are too narrow, and the path shows too much curving.

In Diagram 2, a more easy and even curve is shown, and this one is to be preferred in almost every instance to the other. In this case, two squares are used for the foundation of the curve, the square being divided into three equal sections, working the curve in the manner shown, so that the central portion of the curve shall not pass through the point at which the squares join, but rather outside of the two squares, as shown in the illustration, bi-secting the three central lines at their centres.

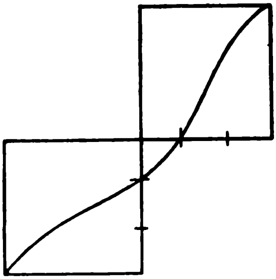


Diagram 1.

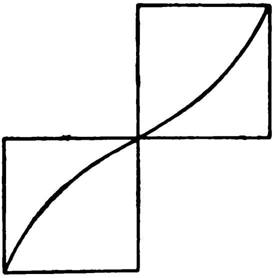
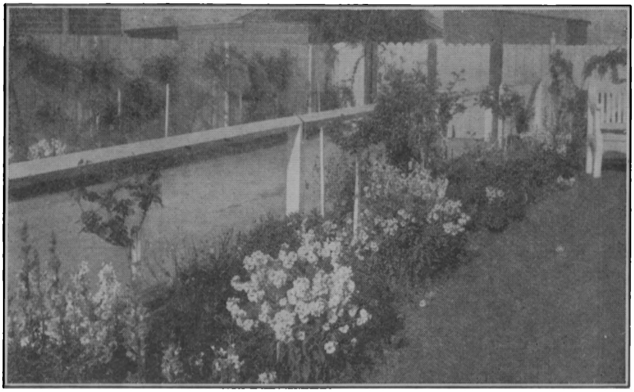


Diagram 2.

In large gardens wide paths are desirable; the wider the path, with a long graceful curve, the more bold is the general effect. Narrow paths are a necessity in small gardens, but in both large and small gardens a variation in the widths of the different paths gives a restful change in the scene.

Where it is decided to vary the widths of the paths, the main path or drive, leading from the gate to the house, should always be a broader one, leaving border walks and shade walks narrower.

In large gardens, the making of the paths as unobtrusive as possible, by keeping them well below the level of the lawns and beds, and allowing the lawns and verges to gradually slope to the path edge, will give a very fine landscape effect, and will increase the apparent size of the garden.

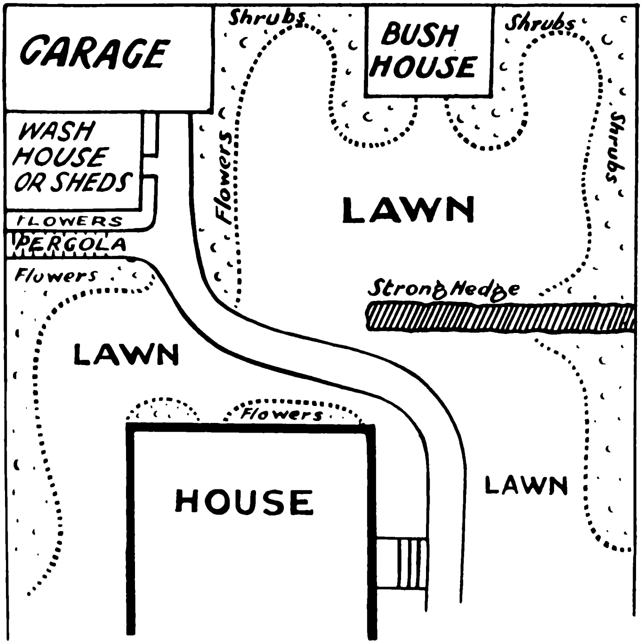


An Asphalt Path.

The Lawn.

In designing the lawn, straight edges should be usually avoided; curved sides and borders, allowing for the planting of shrubs and smaller plants between the lawn and the hedge will generally give a better effect. If the lawn be circular or oval in outline of design, the shape should not be too regular, but rather at one or more points the garden bed should project into the lawn with a short curve, leaving on either side of it a secluded bay. This prevents the whole of the lawn from being under observation at the same time, and again gives a sense of naturalness and increased size to the garden. Thus the even outline or similar ones, as shown in Diagram 1, should be avoided, while designs like that of Diagram 2 might be used.

In short, the general effect should always be to aim at simplicity, and to improve the natural conditions, increasing the views to make them appear longer, having an indefinite end to certain positions, hiding certain portions of the garden, giving an idea of increased size, and generally pleasing even as an open landscape in the bush will please, also offering, perhaps, surprises such as are found in the open.

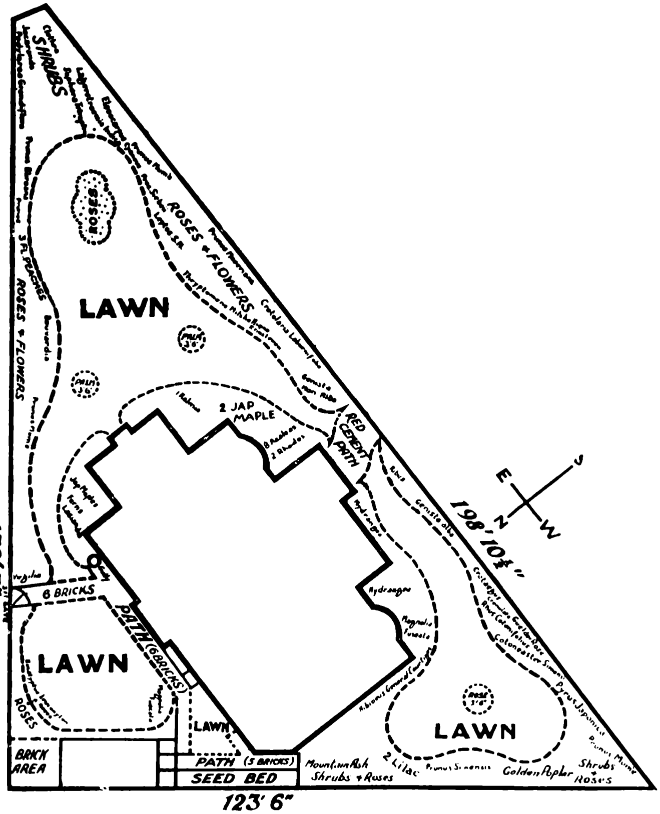


A Lawn Garden.

Levelling Beds and Paths.

It is often necessary for the garden maker to ascertain whether his beds or paths are quite level, or to know a method whereby a slope may be made quite level.

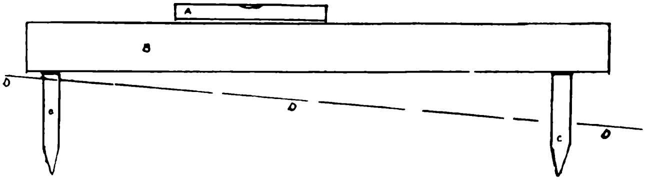
All that is necessary are, a "straight edge," which is usually a piece of softwood or pine six inches



Design for a Triangular Corner.

wide, one or one and a half inches thick, and ten or twelve feet long; a spirit level; a foot rule; and half a dozen hardwood pegs, one inch square and from six to eighteen inches long.

The shortest peg is driven in the ground at the highest level of the plot to be levelled; it should be driven right to the ground level. At a lower elevation, about ten feet away, but no further than the length of the straight edge, another peg is driven lightly in the ground. The straight edge is then placed edgeways on the two pegs, and the spirit level is placed on the top, to test for straightness or evenness. The second peg is then raised or lowered according to requirements, until the spirit level shows the straight edge to be true. The height of the second peg from the ground will indicate the amount or the depth of levelling necessary. If the first peg be driven in to ground level, then the height of the second peg from ground level will show the amount of the fall of the surface, and the depth of filling required. A third, or a fourth peg or more may be used, if the distance to be levelled is considerable. If a circle is to be levelled, the level of diameter of the bed must first be ascertained, commencing at the higher outer edge, and



A. Spirit level. B. Straight edge. C. Pegs. D. Ground level.

having three pegs in line, the two outer being equally distant from the centre one. Then, using the centre peg as a base, six or eight pegs may be driven to form the circumference of the bed.

The spirit level should be tested at least two or three times during the progress of the work.

CHAPTER III.

SOIL PREPARATION AND MANAGEMENT.

As a well and strongly built foundation is necessary for a house, so a well prepared soil is a necessary foundation for garden building.

When a new area is being prepared for the establishment of a garden, it is not only necessary to dig over the soil with a spade before the planting begins, but other and far more important works must be carried out. In order to get the best possible results from the plants, the original condition of the soil generally requires improvement. In uncultivated land wild plants alternately thrive and starve according to the seasons, and only the fittest survive. The results required in a garden, however, are very different. Here a great variety of plants from every land and every clime are grown and are required to look their best all the year round. Hence it becomes necessary to provide an almost perfect soil for them to thrive in.

The successful root-growth of plants necessitates the presence in the soil of moisture and air in addition to the ordinary plant foods, and the supply of these two essentials must be maintained throughout the whole year. This can be ensured only by the threefold operations of drainage, trenching, and soil cultivation.

Drainage.

The construction of underground drains will, without doubt, always improve the quality of the plants and their blossoms; it will economise the water and food supplies, and will make soil work much easier. There may be a few soils, usually of a light sandy nature, that are naturally drained, but the average soil is of a much different texture, and here improvement is always necessary. The stiffer and firmer a soil, the greater the necessity for under-drainage. Briefly, the effects of these drains are to carry away excess water, particularly in the winter, so preventing stagnation and souring of the soil; to allow, at all times, a free admission of air to every part of the soil; and to conserve the soil moisture in summer or in times of drought. The æration of soil is an important consideration for plant roots, and it is quite as necessary that the soil should be ventilated as it is that the rooms of a house should have fresh air. The action of the oxygen, too, on the soil-particles assists in making these soluble, and thus available for plant food.

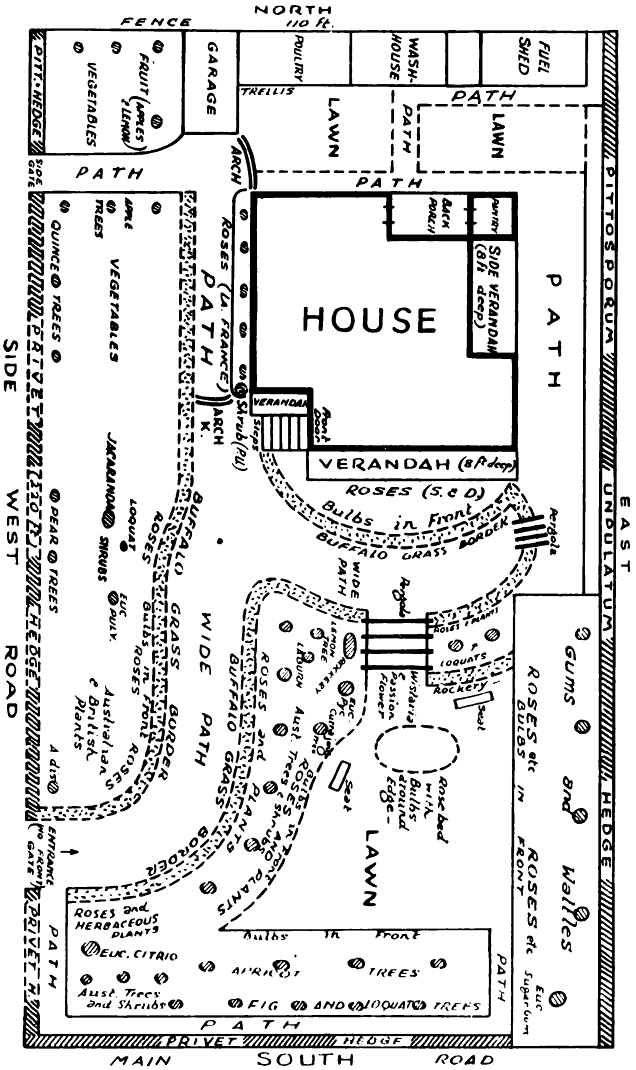
The materials used for drainage purposes may be of an inexpensive kind, such as crocks or cinders; but porous agricultural drain pipes, three or four inches in diameter, form quite the best drains. A shallow bed having been scooped out of the clay, the pipes are laid end to end in it, and pushed firmly against one another. They are then covered with a light dressing of cinders and the soil filled in. The matter of an outlet is sometimes a difficulty, especially in a suburban garden. This is usually overcome by making a brick sink or pit, so that the water, when drained into the pit, may be dipped out with a bucket. Should the clay or subsoil be very much below the surface, the drains should not be placed too deeply in the soil; eighteen inches, or two feet at most, will be ample for efficient working. One principal point is to have the drains below any possible interference by spades or other cultivating implements. In an average firm soil drains need not be any closer than fifteen feet. To prevent rats and other vermin from obtaining entrance to them, each end should be covered with a flower-pot or with several folds of wire-netting. A constant watch should be kept to see that the drains are working, and this can easily be noted in rainy weather.

To test the drains, the hose can be inserted at one end, and allowed to run strongly. Besides testing, this will probably clean out the drain and remove any obstruction.

Trenching.

Trenching or subsoiling means the cultivation of the clay, or the undersoil, as well as the topsoil. This work must be done, of course, before the garden is planted.

The trenching usually practised is known as "bastard" trenching. A top spit of the soil, a foot or eighteen inches wide, and about a foot deep is dug in one part of the garden, the soil being wheeled away to the end of the bed which is to be trenched.



An Australian "Landscape" Garden.

The soil or clay in the bottom of the trench is then turned over with the pick and spade to the depth of six or nine inches. If stable manure or lime be available, a dressing of either, but not both, may be dug into the undersoil. Then the topsoil from the second spit or width is turned over on top of the subsoil which was dug up, leaving a second trench. The clay in this trench is then dug over, as in the first case, the manure or lime being incorporated, and the third spit of topsoil is turned over on top of it. Thus the operation is continued until the area is trenched, and the first spit of soil is used to fill in the last trench. This is quite the best method of trenching in average soils, for the topsoil is not usually deep, and the clay is frequently near the surface. Care must be taken in trenching that the clay is never brought to the surface, and that the topsoil is not buried under the clay. A small admixture of clay with the topsoil is frequently beneficial, especially if the soil be either light in texture or shallow, but it must be well mixed with the loam.

True trenching may be thus described. A spit of soil to a depth of about two feet is taken out and carted away to the end of the bed. The bottom of the trench is dug over and manure added as in bastard trenching, and the topsoil from the second spit to the depth of one foot is turned over upon it; then the second foot of soil is dug right on to the top, thus entirely reversing the soil. The soil which was previously two feet underground, is now at the surface. Then the second trench is dug over, turning the topsoil from the third trench on to it, and the second layer on to the top of that, and so on. It is quite obvious that true trenching can be performed only in deep soils, and it is imperative to note that in no case must the clay be brought to the surface and thrown on top of the loam.

This breaking up of the soil to a considerable depth is of the utmost importance. It is exceedingly beneficial to plants, as it allows a deeper, freer and easier run for their roots. It increases the area of their food supply and is always productive of good results.

Soil Cultivation.

Under average Australian conditions, it is amply sufficient to cultivate the soil to a depth of from eighteen inches to two feet. After all, the main purpose of soil cultivation is to provide an abundant food supply for plants and trees; and this can readily be found in the first foot or two of the soil. Indeed it will only occasionally be found that the feeding roots of our garden plants go lower than two feet. The deeper roots of some trees and shrubs will, of course, go into the clay, for foothold and for water supplies. To cultivate or trench the soil to a greater depth than eighteen or twenty-four inches is, therefore, a considerable waste of energy on the part of the gardener.

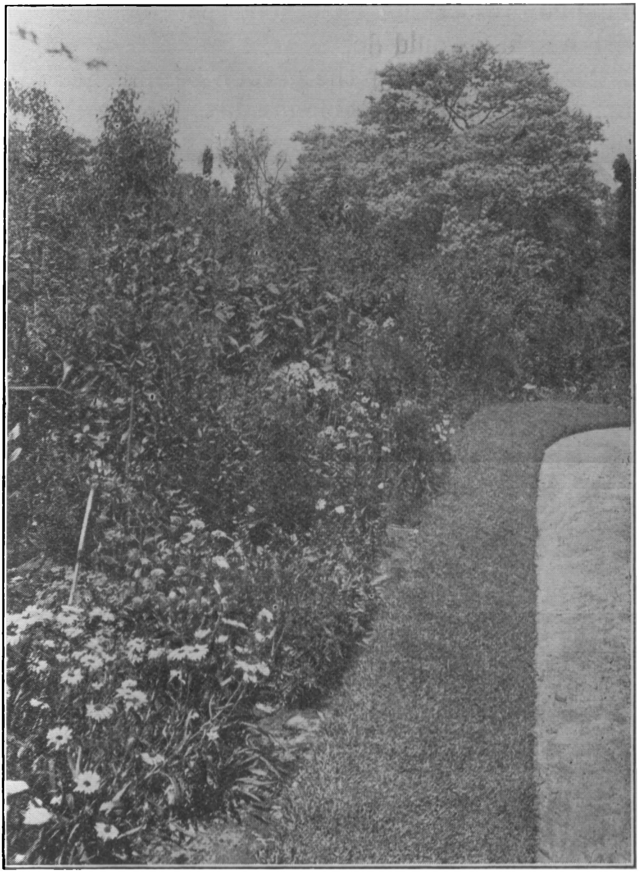
Digging-Over the Garden.

In digging over the garden at the seasonable periods of spring and autumn, the first care should be not to injure the roots of the shrubs and trees, by cutting them with the spade. This is not so important, perhaps, in autumn, except with the winter-flowering plants, as the annual digging in autumn gives certain plants a periodical root-pruning, which checks an over-abundant growth, and possibly enhances the blossoming powers. But in spring when root activity is very vigorous, the cutting of the roots would considerably reduce the growth, and consequently the value and beauty of the plant, for the season.

Digging should be thorough, and two objects should be aimed at: the æration and sweetening of the soil, and the breaking up of the top spit of soil, which, by weather, rain and other influences, has become somewhat solid and compacted. The spade should be forced almost vertically down to its full depth with the pressure of the foot, the spade full of soil being lifted right out and turned completely over. After digging in autumn the soil may be left quite rough, so that the mellowing influences of sun, wind and rain may thoroughly sweeten it. A rough and lumpy condition, too, will have a tendency to catch and hold more rain, and hence a greater quantity of moisture will percolate into the soil.

At the spring digging, the soil should be left even, and fairly smooth, so as to present a level surface to the sun and wind, and thus minimise the loss of soil-moisture by evaporation.

The main use of the fork as an implement of cultivation should be to keep the soil loose and friable during spring and summer. In those seasons, rain or watering will harden and possibly cake the surface of the soil. As soon as it is noticed that the surface is becoming compacted, a light stirring, either with the fork or the hoe is an urgency. Indeed, it will be far better for the health of the plants if both fork and hoe, but especially the hoe, are kept in constant use throughout the spring,



A Buffalo-Grass Border.

summer and autumn. The soil water will be better conserved and surface watering will need to be less frequent. Forking, too, near the base of the shrubs and plants does not cut their roots as cultivation with a spade would do.

Should any part of the garden be mulched in the summer, either with stable manure or lawn clippings, the mulch should be turned in, in early autumn, with the fork.

During the warm months the whole garden surface should be kept in a good tilth, which means the presence of a loose and friable layer of soil on the surface. By keeping the topsoil loose, we expose its particles to the air, which oxidizes certain ingredients, and thus sets them free for plant roots to feed upon; we provide a mulch of cool ærated soil for the plant roots; and by breaking up the continuity of the soil-layers we prevent the gradual capillarity of soil moisture from below to the surface, where it would be lost by evaporation.

Types of Soil—Manuring.

The gardener meets with many different types of soil. Even in a small area soils and subsoils often vary considerably. The problem he has to solve is how to manage or control each particular type efficiently as well as economically. The physical texture of either soil or subsoil frequently needs correction, and it is necessary to do this to the best advantage. It is usually considered that the addition of lime or gypsum to soils will have a tendency to break down the solidity or stickiness of heavy soils, and to lighten the texture considerably.

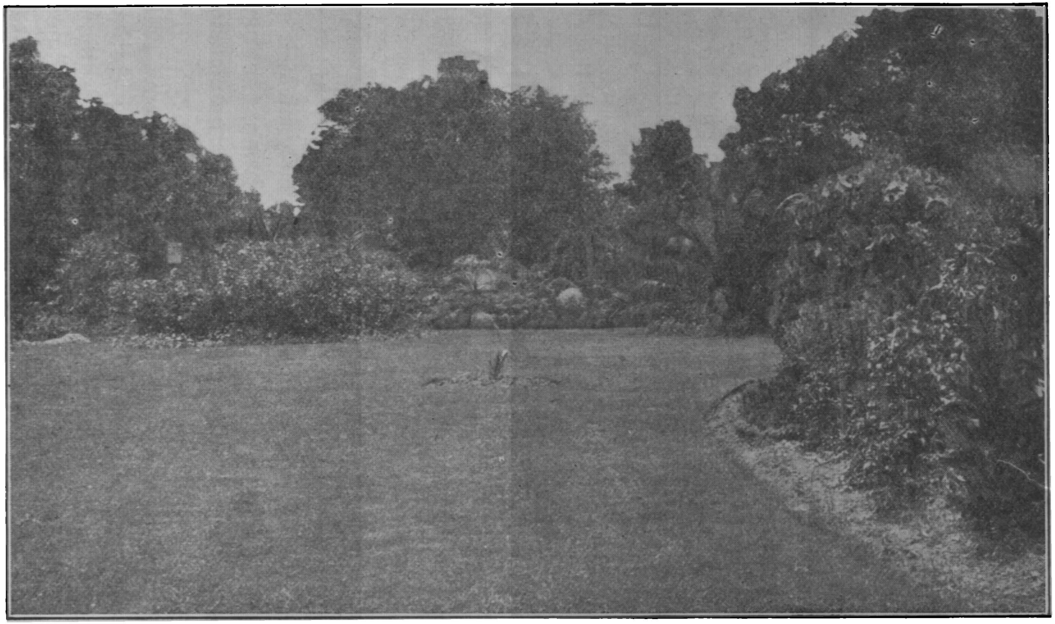
But some limey soils are heavy, and it would hardly do to attempt to lighten their texture with lime. On the other hand, a black volcanic soil is very tough and firm in texture, and it is also a rich soil. Sometimes stable manure is used to lighten the texture of soils, but it would not be economical to add this to a volcanic soil which is already rich in plant foods.

It may be taken as a general rule that where the soils are heavy on account of the clay or of their clay origin, lime or stable manure may be added with beneficial results. The two should not be worked in together, as lime has a tendency to counteract or render insoluble the useful and active properties of the stable manure. The latter should be used first, and then, five or six weeks later, a dressing of lime may be given. A stiff soil may be rendered lighter and also far easier to cultivate if stable manure, containing plenty of straw, leaf mould, wood ashes, and any other organic matter, be worked into it.

Light sandy soils may be rendered firmer in texture by the addition of both clay and stable manure. This improvement is necessary if Roses and other plants loving clay are to be grown.

To lighten a stiff rich soil, such as the black volcanic or basaltic soils, nothing is more efficacious than dressings of sand, well worked in.

Sometimes a sandy cement-like layer, called "hard-pan," is met with between the topsoil and the subsoil. This soil is most inhospitable in its nature, and plant roots will rarely penetrate it. In summer it is hard and solid; in



A Sunken Path (at the far back).

winter it is a loose sloppy mud. Yet it is usually rich in plant foods. Where it occurs, the soil should certainly be thoroughly trenched, and in performing this operation the under-clay should be dug over, and a good admixture of stable manure thoroughly incorporated with the cement-like layer. In general working, it is not wise to mix this cementy or rubbly layer with the topsoil.

It may be taken as a general rule that, if the soil is tenacious and rich, sand or sandy loam will form an excellent corrective to its firmness of texture; while, if it is firm, and of average quality, the addition of stable manure or lime, or both in their season, will attain the desired end.

A sandy soil needs firming either with clay or manure, or both, while a peaty soil will need loam or sand, and an occasional dressing of lime, to assist in the decomposition of the peat.

River-flat or alluvial soils, being formed by the washing down of the best parts of the topsoils, and deposited along the banks of the river, are usually very rich; their texture is generally light, but not too light, and they require practically no correction.

A granitic soil, being formed as a result of the decay of granite rocks, is rich in plant foods, and especially in potash. This soil is usually light, and is likely to dry out in a dry summer. The addition of manure, especially cow manure, will considerably aid its retentiveness.

A shallow soil—that is, one in which the clay subsoil is close to the surface—is usually poor in plant foods. If such soil is to be used for garden purposes it should be well trenched. In carrying out this work only a little of the clay should be added to the top loam, while plenty of stable manure should be worked into the subsoil. Then, a month or so after this initial preparation, a good top-dressing of lime may be given, and turned lightly in with the fork.

Watering and Water-Conservation.

A flower garden is an excellent example of intensive culture. In it plants of almost every class, and from many countries and climates, are grown. It is therefore only natural that it is usually deemed necessary not only to augment the food supplies of plants, but to supply moisture whenever the natural rainfall is not ample to sustain vigor and growth.

Hence watering from artificial sources is frequently resorted to, especially in the summer and early autumn. It is then that the rainfall is often deficient, and many plants of quick and succulent growth, such as Dahlias, and many herbaceous plants, require a more abundant supply of water than is usually contained in the soil. Consequently gardeners resort to the frequent use of the hose, which is the easiest method of garden watering, or to the watering-can.

Whatever method of watering is adopted, care should be taken that the water does not reach the plants or soil with any force, as this is liable to injure the foliage or the blooms, or to wash away the soil from the roots. For this reason, watering with the watering-can is perhaps the ideal method. But many good sprinklers or water distributors are now available, by means of which the water is well broken up and distributed evenly in a fine misty spray. The gardener should endeavor not to give the plants or the soil a heavy drenching, or to give them an unlimited supply; but he should as far as possible give the minimum amount they require.

It is better to water the garden in the evening than in the morning; for during the night the water has many hours in which to penetrate the soil and percolate down to the roots of the plants. Much of the water put on in the daytime is lost by evaporation, due to the wind and the hot sun. Overhead watering is frequently desirable, as after a long hot day the foliage of plants becomes very limp and flaccid. It is not at all dangerous to water the plants even when the warm sun is shining, as it is very rarely that any scalding of the foliage results from it. Dahlias, in particular, are benefited by an occasional overhead watering during the growing period. The only care necessary is to see that the watering does not have the effect of rotting the buds of flowers or causing them to mildew.

Manures and Manuring.

Owing to the great number and diversity of plants and to the importance of stimulating them into a vigorous growth when they are approaching the flowering season, it is often considered necessary to add manure or food supplies to the soil. The term "fertility" denotes a rich condition of soil, and if plants do not thrive in certain soils, the latter are considered poor or infertile. But poor growth is not always an indication of an infertile soil, or that the soil needs manure. Mildura, Red Cliffs, and other places on the lower Murray River, may be quoted as examples of this fact. Only a few years ago this portion of the Murray basin was practically a desert, where only scrub plants would grow. But the application of water to the so-called desert worked a magic change, and these flourishing settlements now rank as the most fertile tracts in Australia. On the other hand, the application of water to certain soils in the northern central areas of Victoria brought about an excess of saline or alkaline conditions, which quickly killed off all the trees and plants in the districts irrigated. Drainage here, of course, is the natural corrective.

Again, it does not necessarily follow that, because certain parts of a garden have been growing plants for many years, the soil requires manure. It is evident that infertility of soils may not be always due to the absence of plant foods; it may be entirely due to other factors. But if a soil, after being well drained and trenched, and after satisfactory cultivation, produces weakly plants which appear to require stimulants, then the question of manuring may be considered. For if the physical conditions of the soil be satisfactory in every way, very little additions in the form of manures will be required. The derivation of the word manure (manus, the hand) shows that cultivation was originally considered the more important factor in soil fertility.

There are three methods of fertilising gardens, apart from the mechanical operations already discussed. These are supplying humus in one of its forms; adding chemical plant-foods or manufactured manures; and making available the plant foods already in the soil. The last result is attained by adding lime or gypsum to the soil in small dressings. A dressing of four ounces per square yard is equal to over half a ton per acre, and that is exceedingly liberal. Lime assists in the decomposition of humus; it breaks up or flocculates the clay, and in so doing, it sets free much plant food contained in it. In addition to these manurial effects, lime is beneficial in assisting in the development of useful soil bacteria, in sweetening soils, in killing off insect pests, in reducing fungus diseases, and in benefiting the garden in many other ways.

Humus.

"Humus" is the term which is applied to all forms of decayed animal and vegetable matter in the soils. It is frequently, but not always, the cause of the dark colors of soils. This characteristic is usually desirable in soils, for the reason that the dark color absorbs solar heat freely, and therefore plays an important part in plant growth and development. Humus may be added to the soils by the addition of animal manures, weeds, leaf mould, garden litter, plant and animal refuse of any kind. For this reason, the saving of all weeds, plant refuse and similar substances, and the storing of these in middens or compost heaps until they are well rotted, is to be strongly recommended. The stouter parts of plants, such as prunings, broken boughs, old roots, as well as large bones, should be burned before they are added to the soil. On account of the large proportion of resin they contain, sawdust and pine needles should also be

burned before being dug in for humus. The practice of adding humus to the soil in large quantities is largely followed by orchardists, who in early autumn, sow field peas or beans in their orchards, and in the spring plough in the resultant green crop, which is known as green manure.

Animal Manure.

Several forms of animal manure are available. None, however, should be used until fermentation has set in, and until it has at least begun to decay. In storing manure preparatory to using it, it should not be heaped where rain will wash out the best of the liquids. It should be stored dry: it should not on any account be sprinkled with lime. If the odour becomes offensive, a little soil sprinkled over it will remove the trouble.

A certain percentage of straw, grass or seaweed, which may have been used for bedding, is not an objection; but if wood shavings or sawdust have been used, this should not on any account be worked into the garden, for in decaying it sours the soil and adds fungus troubles as well.

Horse manure, more or less rotted down, is a safe manure for any garden, and for almost all plants. Cow manure is a cold manure, and is better for use in summer. It is very suitable for such plants as Liliums, Pansies, Rhododendrons, Azaleas, Lily of the Valley and Tuberoses. Fowl manure is heating, and should be used only when well rotted. It is not a safe manure for bulbs of any kind. Pig manure is very rank and rich, and should not only be used old, but soil or sand should be mixed with it before spreading. Pigeon manure (squab farms are the producers of this) is very rich and valuable for almost any type of plant.

Artificial Manures.

Sheep manure is one of the best of animal manures, and may be used in all soils, and for all types of plants. It usually contains a considerable percentage of weed seeds, and so should be well rotted before use.

Of chemical or manufactured manures, commonly termed artificial manures, those in general use are superphosphates, bone-dust, and blood manure. Others less in use are potash in several forms, such as nitrate of potash and sulphate of potash, sulphate of ammonia, nitrate of soda, and Thomas's phosphate or basic slag. Lime is also used in many cases as a manure, but as has been already pointed out, the action of lime as a manurial agent is a secondary and indirect one. Potash is a necessity in garden soils, and one prolific source of this manure is wood ashes, which are very common in districts where wood is the chief fuel. Coal ashes contain very little potash, and hence are useless as manure.

Superphosphate is a quick acting manure whose efficacy soon disappears. It is therefore to be used only on growing plants or seedlings. It is often used as a quick stimulus to hurry on young seedlings or plants in their growing stages. It is wise to follow on with a more lasting manure. Thus superphosphate and bone manure or bone-dust are often used in conjunction, or the latter is added to the soil two or three weeks later.

By reason of the longer time that the larger particles especially take to decay, the work of bone-dust extends over a long period. Bone-dust is a safe plant food for almost any kind of garden plant, whether tree, shrub or herbaceous plant.

Potash is still slower in action, but all the same it is a most valuable plant food. It gives strength and stability to the plants; it is especially useful for giving vigour, and building up the buds; and it is sometimes supposed, although this point cannot be definitely stated, that it adds richness of colour, especially red, to flowers and fruit.

Nitrate of soda is a wonderful food for foliage purposes; so is sulphate of ammonia. These may be used on young plants; and the vigour and color they impart to the foliage is especially noticeable. Lawns particularly benefit from a top-dressing of sulphate of ammonia, while nitrate of soda is generally used for vegetable growing. Neither of these manures should be used for flowering plants after the flower-buds have become well developed.

Blood manure has rather an offensive odour, and should be quickly forked into the soil after sprinkling. It is quick in action, and safe, and is used on growing plants to stimulate and strengthen them into vigorous growth.

One to two ounces per square yard is a safe application for all chemical and manufactured plant foods.

CHAPTER IV.

FRIENDS AND FOES IN THE GARDEN

Snails and Slugs.

It will generally be conceded that snails and slugs, and especially the latter, are amongst the worst foes of the gardener. They are most voracious feeders and destroy very many of the gardener's choicest plants. If a plant be at all treasured, that is the one which these pests will surely attack. Snails or "shellbacks," do far less damage individually than the slugs, though where they are prevalent, they are a formidable foe.

The small clear, semi-transparent eggs of both snails and slugs are often met with among rubbish, stones, flower-pots, and loose soil, especially in spring-time. Only very slight pressure is necessary to destroy them. In these places, too, will be found the living pests. Snails also like to harbor among close-growing climbers, such as the English Ivy, Ivy-Geraniums, Nasturtiums, and similar plants, and on the fences or trellises under such climbers. In grass, too, they are usually very abundant, and a careful inspection of the lawns, particularly in winter and spring, will reveal many dozens of these pests. They harbor, too, among the growths of strong succulent plants, such as Crinum, Agapanthus, Richardia (Calla) Lilies, Calocasia, and the like. When it is considered that a single slug may be answerable for five or six hundred eggs in a season, their prevalence is easily accounted for.

Certain birds are particularly fond of snails and slugs. The Magpies, Mudlarks, and English Thrushes feed voraciously on them. The latter bird usually has a favorite stone where the snail-shells are cracked, and small heaps of broken shells may thus often be seen in gardens, showing the useful work of these busy birds.

The digging-in of lime in the autumn, sprinkling it on the surface, shaking it among climbers and clumps of plants will all tend to reduce these pests. An occasional liming of the lawn, or other grasses, and the clearing away of grass and weeds will also be helpful. The beneficial effects of lime are soon gone, however, so that applications will need to be repeated occasionally. A ring of tobacco-dust, or sawdust saturated with Phenyle, placed around special plants will keep these pests away. Watering lawns and gardens with a weak solution of sulphate of ammonia, say about two ounces to the gallon, is also helpful. This solution must not fall upon the foliage of tender plants. Soot and wood-ashes used in gardens will also minimise these pests. Further, spraying tender plants with Paris green, and strong-foliaged plants with arsenate of lead, will poison the pests when they attack these plants. There are many proprietary slug killers on the market which claim to be effective. If empty inverted flower-pots and cabbage-leaves or orange peel are left about the garden, slugs and snails will harbor under them. The pests may then be captured in the early morning.

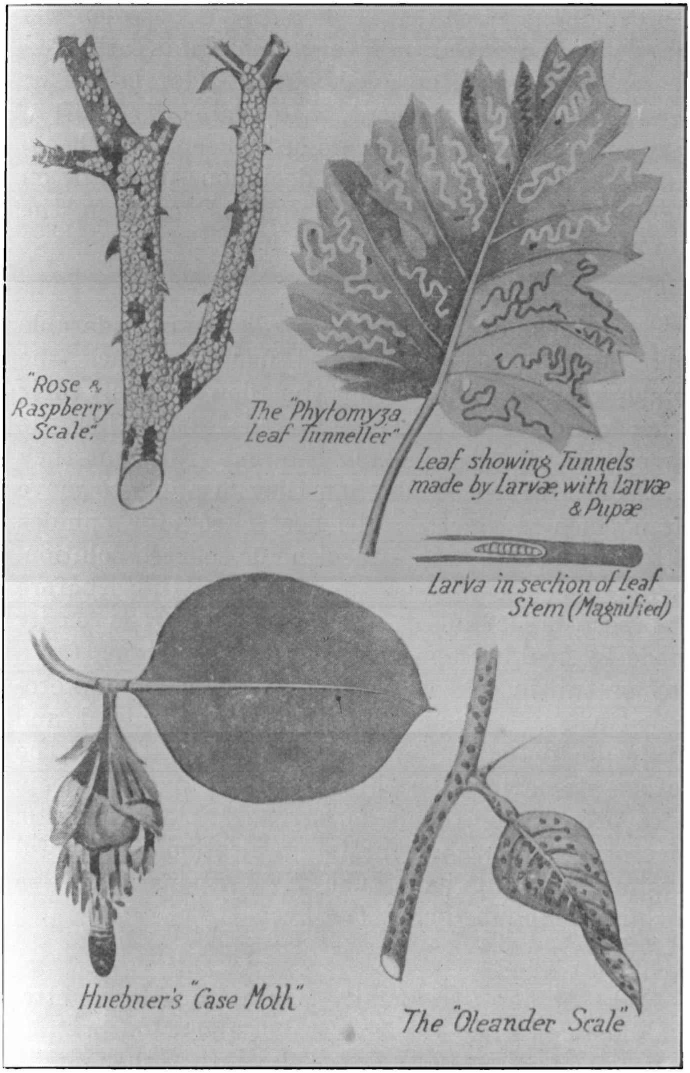
The latest remedy for slugs and snails is Calcium arsenate, or arsenate of lime. It is the most effective specific ever recommended, and the use of it will almost eradicate snails and a large proportion of slugs and slaters as well. One part by measurement (not by weight) is sprinkled over nine parts, by measurement, of moistened bran. The whole is well mixed together and sprinkled among the haunts of these pests. Occasional applications will be needed, to keep them in check.

Caterpillars.

Many choice plants and garden-shrubs are often attacked by leaf-eating caterpillars. There are many species, and to enumerate them all is impossible here. The suppression of this class of pest may be carried out by one of two spray mixtures, arsenate of lead. If the foliage is weak or succulent, or the plant is at all delicate, a weaker spray should be used. Case-moths or stick-case caterpillars are larvae that construct a tough silky case, around which they place small sticks, twigs, or dead leaves. All of these are for protective purposes. The caterpillar lives in its case and feeds on the various plants, leaving the case suspended while it is feeding. Arsenate of lead will quickly poison these larvae also.

Scale-Insects.

Garden plants, particularly garden shrubs and palms, are frequently attacked by scale-insects. These are very small insects which build a circular or oval-shaped scale, living under it for protection. The insect itself lives by sucking the juices or sap. To destroy scale-insects, a good spraying with lime-sulphur is the most effective. In the case of roses


"Rose & Raspberry Scale."
The "Phytomyza Leaf Tunneller"
Leaf showing Tunnels made by Larvæ, with Larvæ & Pupæ
Larva in section of Leaf Stem (Magnified)
Huebner's "Case Moth"
The "Oleander Scale"

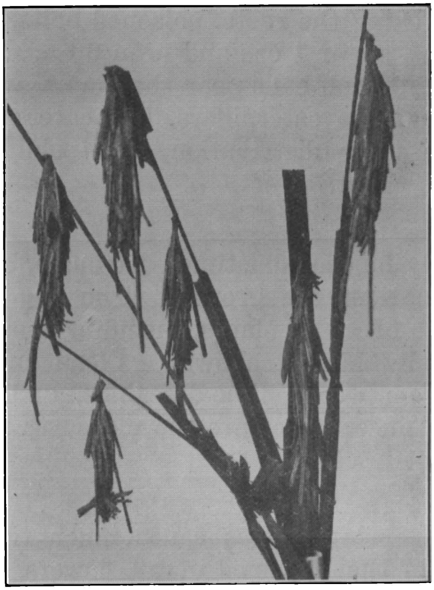
and deciduous shrubs, this should be done when the foliage had dropped. Evergreen plants attacked by scale should be sprayed when tender leaves or flower-buds are not present. Red-oil spray is often used to exterminate the scale or to keep it in check, but it should be used only on deciduous plants or on plants of firm and hardy foliage. Even then, the summer red-oils only should be used.

Aphis.

The attacks of aphis cause gardeners considerable anxiety, and as the aphides usually attack the tender-growing shoots or the flower-buds, their attacks cause much damage and loss. Like the scales, they live by sucking the plant-sap; but they have no protective scale, and they are able to move from place to place. The best check for aphides is to spray them with a nicotine or tobacco solution. It may be necessary to spray several times before the pest is conquered. Tobacco-water is easily made by soaking one pound of tobacco-stems for a day or two in cold water in an old bucket or kerosene-tin. The liquid may be then strained and made up to four or five gallons with water. The refuse stems may be thrown on the manure-heap. Any preparation, such as surpazol, black leaf 40, nicotox or niquash, containing nicotine, is helpful against the aphis pest, such preparations known as nicotine sulphate being the best.

Red Spider.

Red Spider frequently attacks Mignonette, Dahlias, Violets, French Beans and Montbretias. Where Dahlias are grown for show, the other plants named should not be grown near them. Water-spraying, constantly keeping the spray going, or nicotine sulphate sprays, may check this pest somewhat. But it is very difficult to combat, and perhaps the best method is to pull the affected plant up and burn it, liming the soil well immediately afterwards. Benzole emulsion or soaperine may also help to check it, but nothing has so far been found that is perfectly effective.



Stick-case Caterpillars.

Cut-worms.

Cut-worms are the larvae or caterpillars of certain dark-coloured moths. These do much damage by eating through and cutting the roots of many garden plants. The caterpillars or cut-worms hide by day, about an inch under the soil, feeding mostly at night. If they feed on the plant above the ground, as they sometimes do, arsenate of lead should be sprayed on the foliage and stem. If the pest is attacking the roots, poisoned baits, made of arsenic 1 oz., sugar 1 oz., and bran 6 oz., moistened and placed in small balls near the plants, will sometimes attract the caterpillars, but care should be taken with their distribution when children and animals are about.

Mealy bugs.

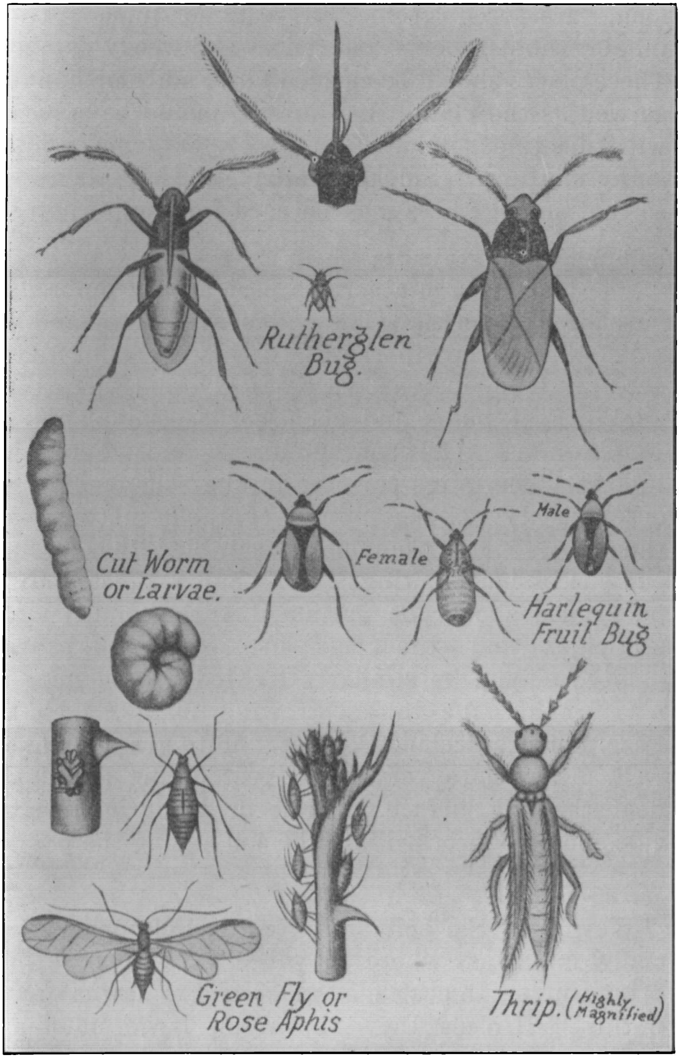
The mealy bug is sometimes a trouble, especially where Carnations are grown. The bug will live on the roots of many plants, including most weeds, and especially Marshmallows. Clean cultivation, freedom from weeds, lime-dressings, and the use of manurial insecticides are the measures for keeping this pest in check.

Thrips.

In warm spring, thrips cause much trouble by swarming in the blossoms of all flowers, and also the young growing shoots of succulent plants. The leaf-bud growths and flower-buds may be sprayed with tobacco-water or a soft-soap emulsion; but the pests come in such countless millions that these, or any other sprays, have little effect.

Rutherglen fly and Harlequin bug.

The Rutherglen fly, a small grey-coloured fly, and the Harlequin bug, a brightly-coloured red-and-yellow crawling insect about a quarter of an inch


Rutherglen Bug.
Cut Worm or Larvae.
Female
Male
Harlequin Fruit Bug
Green Fly or Rose Aphis
Thrip. (Highly Magnified)

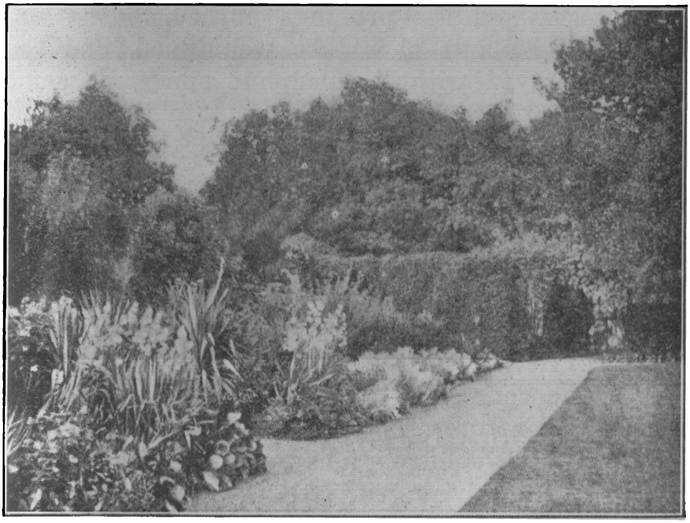
long, are troublesome in summer-time. They inhabit rubbish-heaps, old fences and weedy patches. These places should be cleaned out, and their haunts, as well as the plants they infest, should be sprayed with nicotine sulphate, tar-water, or some similar spray mixture. Smoke will drive these pests away, so that smudge fires may be used for the purpose.

Bulb mites and Pea mites.

The bulb mite is a serious pest among bulbs and herbaceous plants. The mites are white and so small that except in the mass they are difficult to detect. They increase very quickly, and will attack all kinds of bulbs and such herbaceous plants as Delphiniums, Chrysanthemums, and Perennial Phlox. The mites can live in the soil, feeding on decaying as well as living vegetable matter, and thus they remain from one season to another, killing out successive plantings. All bulbs affected with bulb mite should be sprinkled with manurial insecticide, and the soil in which they are planted should be similarly treated. Pea mite is also troublesome to low-growing plants, such as Peas, Lettuce, Iceland Poppies, and to grass lawns as well. This is a very small pest, living low down near the soil surface. Lime or manurial insecticide should be worked into the soil among the plants.

Worms.

Worms in the soil are often troublesome, especially in lawns, where in winter and spring they bring up earth-castings, making the lawns quite untidy. Unless they appear in large numbers, worms are not objectionable. Indeed, they play a valuable part in the economy of the soil, since by their burrowings they assist in its æration. If troublesome, they may easily be checked by a dressing of lime, by watering with lime-water or sulphate of ammonia water, using one ounce to a gallon of water.



Delphiniums and a Cypress Arch.

Leaf-miner fly.

The larvae of the leaf-miner fly are very small, and they have become a serious pest to many garden plants. The very minute caterpillars burrow under the epidermis of the foliage of plants, and in many cases destroy it. Many Wattles are being attacked, and in some localities it is impossible to grow *Acacia podalyriaefolia* successfully owing to the depredations of this pest. Chrysanthemums and various types of Marguerite Daisy (*Chrysanthemum frutescens*), Cinerarias, and other aromatic plants suffer very much. The miners also attack such weeds as Cape Weed and Sow-thistles. These weeds should not be allowed to grow in gardens. All plants attacked should be pruned hard back, and the prunings burned. The soil around the plants should be well limed, and the plants sprayed with lime-sulphur spray, or some strong nicotine sulphate solution. In the case of Cinerarias and other small plants, the affected leaves must be cut off and burned.

Canary-fly.

A small pest known as jassids, or canary-fly, is responsible for the destruction of growing shoots of Roses, Dahlias, and many other plants. These minute insects are canary-yellow colored, and are not unlike very small cicadas, or so-called locusts. The only measures that can be taken against this pest are of a deterrent character, and the plants should be sprayed with nicotine sulphate, and similar sprays.

Stem-borers.

Stem-boring caterpillars often trouble certain trees and shrubs. Acacias and Eucalypts, as well as Flowering Peaches and Cherries, are often subjected to their attacks. The grubs work in so insidious a manner that great damage is done before their presence is noted. They bore into the trunks and stems, and the openings to their borings are usually covered with the "sawdust" in combination with a webby and gummy excretion. The "sawdust" may often be seen on the ground at the base of the plant. The entrance to the boring must be found, and a copper or other pliable wire worked into the tunnel in an endeavour to kill the grub. Then, after pouring in a few drops of bi-sulphide of carbon or phenyle, the opening should be sealed with soap or clay, or with a mixture of both. If any limbs are badly attacked, they should be cut off and burned.

Insect Friends.

The insect friends in the garden are not nearly as numerous as the foes. Still, they do good work. The three principal ones are ladybirds, lace-wing flies, and the Mantis. Ladybirds are well known. Lace-wing flies are small flies with lace-like, drooping wings. Attracted by light they frequently fly into houses during summer evenings, and, when crushed, emit a somewhat offensive odor. Both of these insects, as caterpillars and also as perfect insects, are voracious feeders upon scale and aphis pests, of which they destroy millions in a season. The praying mantis is a long-bodied and long-legged insect with green leaf-like wings, and feeds on aphis, as well as flies and mosquitoes.

The Calosoma beetle, which comes out in summer-time, feeds largely on cutworms and caterpillars in the soil. This is a broad, bronzy green beetle, which smells offensively when handled.

Dragon-flies, often wrongly called "horse-stingers," are also useful insects. In the larval stage, they live under water in ponds and streams, feeding on mosquitoes and other pond-life pests.

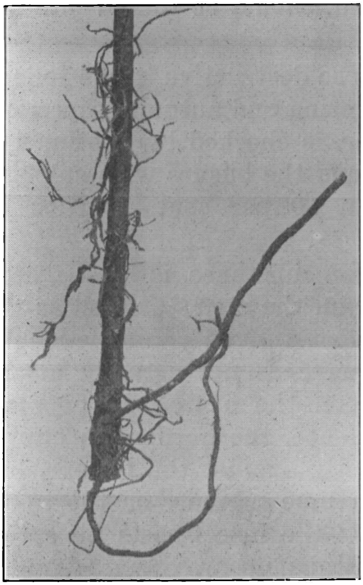
A race of flies called hover-flies (so called from the way they hover over plants) are responsible for the destruction of very large quantities of aphides, which they devour greedily. The flies are frequently hairy, and some species have golden bands on the bodies like an Italian bee. These flies are not only parasites on aphis, but other species attack caterpillars, case-moth caterpillars, and others. The larvae of one species live in rotting refuse, or in liquid-manure tubs. They are often called "Rat-tails," from the long tail-like end of the abdomen.

Then, most of our wasps are wonderfully helpful insects. By collecting caterpillars of all species, which they place in their mud nests as food for their young, they rid the garden of many hundreds of larvae. Other wasps inject their eggs into the bodies of leaf-eating caterpillars, which are destroyed by the larval wasps which hatch out. The latter then build their small white cocoons around the dead and dried body of the caterpillar they have fed upon.

Fungus diseases.

Fungus diseases are more subtle and, as a rule, less discernible than insect-pests. The method of treatment, too, is quite different. The gardener sprays for insect pests when he sees them or knows that they are there. But to ensure the greatest success against fungoid troubles, the fungus should be anticipated and the spray work done, if possible, before it comes. In this case, spraying will exemplify the proverb that "Prevention is better than cure." Half the battle is won by attacking the fungus almost before it is seen or perhaps before it has time to spread.

Black-spot of Roses assumes the appearance of dark circular spots on the foliage, which finally dies and drops to the ground. Certain Roses are more subject to this than others. The bushes should be well sprayed in winter with Bordeaux mixture or Liver of Sulphur. The leaves should be gathered up and burned.



ROOT ROT.

(Armillarea).

All of the strands, except the two thick ones, are the growths of Root Rot.

When plants decay at the roots the trouble is usually due to root-rot, known as armillarea. This fungus will infest almost any and every plant root, finally killing the plants. It is usually found in old gardens or in undrained soils. Soil-drainage, and liming the soil, using lime about ¼ pound to the square yard, are the usual remedies. The dead and decaying roots should be removed from the soil and burned. Several lime-dressings will possibly be necessary. Where root-rot has obtained a considerable hold, a dressing of sulphate of iron, using 4 ounces per square yard, should be forked into the soil.

Rose mildew which is so destructive to the foliage and young growths in spring and autumn, especially in moist or wet weather, is checked by dusting the foliage and the soil around the bushes with sulphur, or by spraying with a 10 per cent. solution of potassium sulphide.

Sometimes a soot-like substance is to be seen upon shrubs, appearing on the stems as well as the foliage. This is the soot fungus or sooty mould. In this case, the fungus does not actually attack the plant, but lives upon the excretions of scale insects or aphides. Hence, the gardener's efforts will not be turned directly against the fungus, but against the scale, with lime-sulphur, or the aphis with tobacco-water. If the insect-pests be exterminated, the fungus will disappear.

During the last few years Rose-bushes have been attacked by a bacterial disease which quickly kills off the plants. The newer wood browns and hardens, the young shoots and leaves wilt and die, and the stem gradually dies from the newer to the older wood. The disease is readily carried by aphis, and it may also be communicated by secateurs and other pruning tools. The advance of the bacteria may be kept in check by cutting off the diseased parts and painting the bush with a solution of permanganate of potash (Condy's crystals), using one ounce of the crystals to one quart of water. This application will probably be needed three or four times, at fortnightly intervals. All pruning and cultivating tools should be sterilised after use, by dipping in boiling water or in the potash solution. Phenyle water has also been used with success. But if the attack be a bad one the bushes should be pulled out and burned.

Applying the Remedies.

The careful gardener will always have a box or cupboard, containing various sprays and pest destroyers in a convenient place, so that a spray or other remedy may be used as soon as needed.

An important part of the gardener's equipment is a hand-syringe or a hand-sprayer with which to apply the remedy. This should be preferably made of brass, so that it may be used for all mixtures and will not corrode. If there are any rubber parts, these should be cleaned out with soapy water after an oil or greasy spray; any leather part should be kept oiled. Neither rubber nor leather parts should be left standing exposed to the weather, especially to the sun.

A half kerosene-tin, the bottom being perforated with nail holes, will be found especially useful as a lime or chemical-manure duster and dredger. This will serve to distribute the lime or manure more regularly and evenly, and in a powdery form.

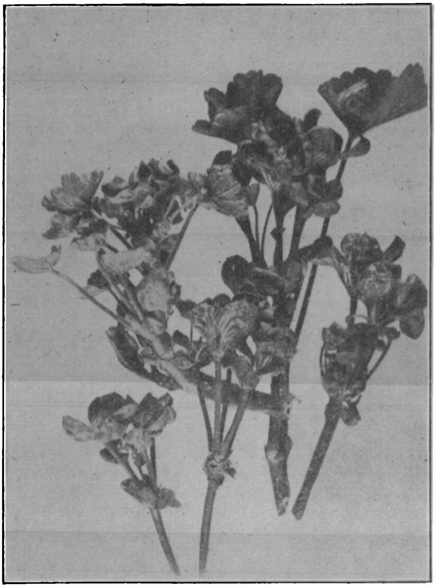
Several pieces of old hessian are useful, for dusting fine lime on Carnations and other plants and for dusting sulphur on Roses. The lime or sulphur is simply tied in the hessian, and the bundle is shaken over the plants. A small tin, like a baking-powder tin, with a perforated lid, is also useful for this work, but the hessian is better, as it distributes the powder more evenly.

It will be noted that in this chapter very few formulae have been given when certain remedies have been recommended for the different pests. In all cases, it is readily possible to purchase these remedial mixtures from seedsmen and spray-material suppliers. Most of the spray remedies are sold in ready-made form, and in such cases the quantities to be used and the strengths at which the mixtures are to be applied, are always printed plainly on the labels attached to the packages.

Greening and Fasciation.

One occurrence in gardens—the "greening" of plants—is somewhat perplexing to gardeners. It is found that sometimes a plant, instead of producing normal flowers, will produce growths, somewhat florally shaped, but green in color. The plants grow vigorously enough; in some, the exact floral appearance is formed, except that it is green; and in others, clusters or masses of small green leaves appear instead of blooms.

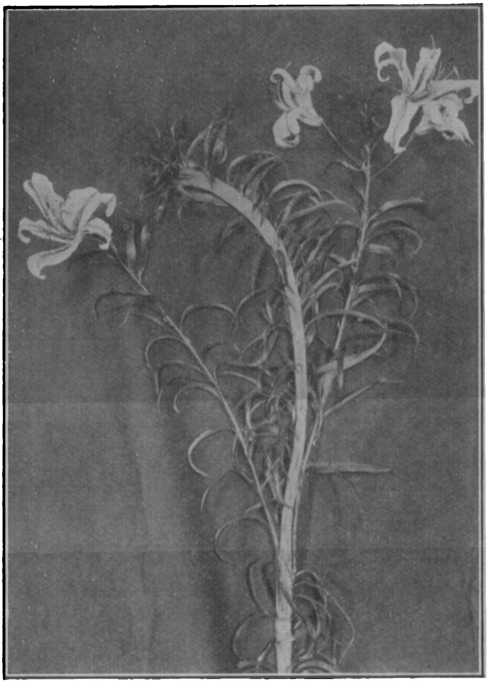
This greening is somewhat of a problem, as all investigations so far carried out have been quite inconclusive. It is commonest in annuals and herbaceous plants, and rarest in perennial shrubs. The flowers do not produce seeds, but of the perennial plants the greening may be perpetuated from buds or cuttings. It is in this way that we obtained the green Rose. Years ago a Rose-bush "greened," giving small green growths, in which the colored petals are produced like green bracts. There is nothing beautiful about it: it is more or less a freak.



"Greening" of Zonale Pelargoniums.

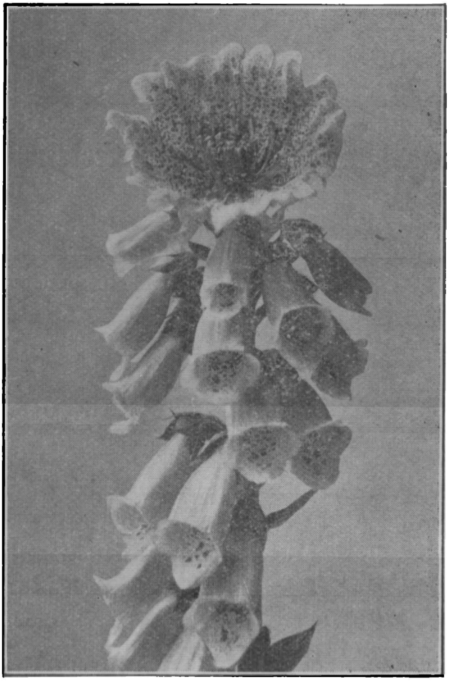
Similarly Pelargoniums, both zonale and regal, occasionally "green," and so do the Marguerite Daisies (*Chrysanthemums frutescens*). It is to be found in Perennial Herbaceous Phlox, in Perennial Sunflowers, and other herbaceous plants; and also in Asters, Phlox, Zinnias, Stocks, and many other annuals.

Many causes have been ascribed as the origin of this trouble, including insects, fungi, and many other objects. At present the only feasible explanation seems to be that of "reversion"; that is, that the plant, owing to some unknown cause or causes, has reverted to the original type of flowers or to the primitive green types of flower-growths of centuries ago.



Fasciation (Auratum Lily).

Many remedies have been tried, from cultivation, pruning, and spraying to injections and manuring, but there are no records of any successful results.



Fasciation (Foxglove).

It is further thought that one of the main causes of the trouble is the continuous inter-breeding that is going on among plants, in the modern search for varieties and novelties.

Fasciation.

Another appearance among garden plants is known as "fasciation." Among normal growths, an abnormal growth will appear usually in the form of a much flattened and sometimes thickened stem. This malformed growth will usually produce small leafy growths on the flattened sides, carrying at the summit a much enlarged monstrous flower, or a number of malformed flowers. Occasionally the flowers will be quite normal on the fasciated stem. Thistles, Daphne, Liliums, and other plants, frequently develop these abnormalities. There is no known remedy; indeed, the cause of these monstrous growths is quite unknown. It is better to cut them right away from the plants when they appear.

CHAPTER V.

NAMES AND TERMS OF PLANTS

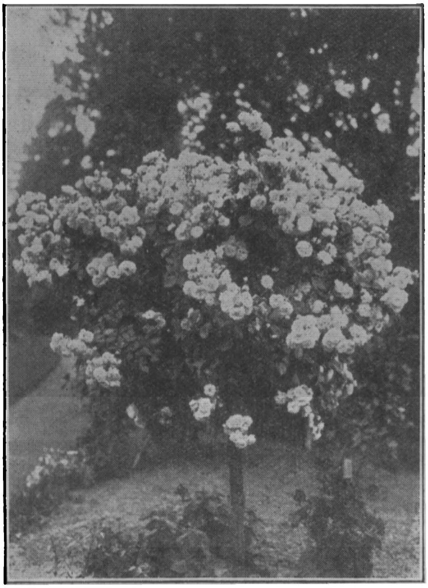
"Standards."

A great deal of confusion exists in the minds of the average amateur in regard to the terms that are used by gardeners and in horticultural publications. For instance, people very frequently take the word "standard," when used in regard to Roses, to mean a Rose of a standard or of a certain type, perhaps a Rose of good form and substance, whereas the nurseryman applies the term "standard" to a Rose which has been worked or budded on a single stem of a good height, say, three feet.

It is therefore thought advisable to include a chapter explaining the various terms used in gardening.

"Species" and "Variety."

All garden plants came under two classes, natural species and florists' flowers. By a "species" we mean any plant that is native to any country, which has not been produced by any hybridist's art, and which is not naturally a hybrid. Hence, Gum Trees, Wattles, the native Heath, Orchids, and all of our other native plants, may be classed as natural species.



A Good "Standard" Rose Plant.

A species is usually taken to mean a plant which differs more or less from every other, the difference chiefly being in the reproductive organs. The botanist does not take account, so far as a species is concerned, of differences in the shape or the size of foliage or in the color of the flower. Sometimes a plant may show these variations, and in that case it is classed as a "variety" of a species. Thus *Eucalyptus leucoxylon,* the well-known Australian Ironbark, with fine large white flowers, is typical of a species. Sometimes this tree is found producing red or pink blossoms. This is termed a variety, and in this particular species the variety is called *rosea.*

The question is often asked why Latin and Greek are used in the naming of plants. The answer is that if common names alone were used, a great deal of confusion would arise; further, the common name is usually in the language of the country of which the plant is a native. Thus the name "Gum Tree" may be quite familiar to all Englishmen, but to a Frenchman or a Spaniard who has no knowledge of English, the term would be quite foreign and inexplicable. Latin and Greek are the languages of students the world over, and so a botanist in any country would recognise any plant-name according to the accepted rules of nomenclature in these languages. When a new plant is discovered and described, the description is usually published in Latin, so that, if it be found in any other country, the finder will be able to place it under its correct designation.

Natural species and varieties are true wild plants of any country growing naturally.

"Hybrids."

Florists' flowers are known by botanists generally as "hybrids." These are variations and perhaps improvements of species, and they are far more numerous in gardens than the natural species. Hybrids are of two classes—those which come by chance, and those which come by design, as the result of hybridisation carried out by man. Generally speaking, florists' flowers are more prevalent in gardens because they comprise improved flowers, and are usually a triumph of the hybridist's art. By hybridisation and selection man can do, and has done, in a few years' time what it would take Nature centuries to accomplish.

Nature never produced the Cactus, Pæony, or Collarette Dahlia, so far as we know. She took thousands of years to give us the old Dahlia forms, and in less than fifty years, as a result of hybridisation and selection, man has reached the high standard of excellence in the production of Cactus and many other Dahlias from the older wild and generally single types.

"Sport" or "Variant."

The term "sport" is frequently used by gardeners, the botanical term being "variant" for the same occurrence. A sport is a variation of a plant which occurs on the plant and not as a result of a change brought about by hybridisation and seed-production. For instance, the fine well-known Rose, Maman Cochet, was produced as a seedling many years ago. This Rose grew, producing everywhere the much-admired pink blossoms. Then somewhere in a garden a certain shoot, instead of producing pink blossoms, produced white ones. The nurseryman who observed this took the buds and budded them, so that he was able to sell a new Rose, exactly like the parent in every way except that the color was white instead of pink. This White Maman Cochet is a "sport" of the Pink Maman Cochet.

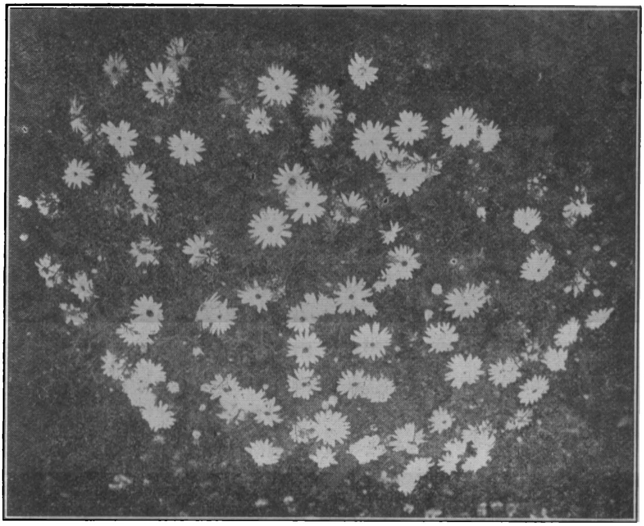
Sometimes a plant which has green foliage will produce a shoot which has variegated foliage. The nurseryman will take this shoot and propagate it, either by budding or grafting, so that, as it gradually increases, he is able to send out a variegated form. Thus we have variegated Pittosporums, Cypress, and many other plants. These are called "variegated sports." It is an exceedingly rare occurrence for a sport to come true from seed.

"Annuals," "Biennials," "Perennials."

According to the term of their natural life, plants are classed as "Annuals," "Biennials," or "Perennials." Annuals are those which bloom, produce their seed, and die in the same year in which the seed is sown, and thus last for one season only. There are several classes of annuals:—"Hardy Annuals," which give the best results when sown in autumn. They have a long period of growth, and are able to withstand ordinary frost conditions in the open. "Half-hardy Annuals" are sown in the spring, not too early, and bloom later, generally in the autumn. They cannot stand the frost, and their life-period is very much shorter than that of the Hardy Annuals. There is sometimes another type of annual, classed as "Tender Annuals," which is even more delicate than the Half-hardy type, but as a rule the delicate constitution is really more a matter of climatic conditions than of classification. Thus an annual which would be rightly described as

"Tender," in the south of Tasmania, would be perhaps Half-hardy, or even Hardy, in Sydney.

Among the Hardy Annuals are Sweet Peas, Cornflowers, Larkspur, Poppies, Mignonette, and among the Half-hardy Annuals are Phlox, Zinnias, Cosmos, Asters and Balsams.



Double Marguerite Daisies (Mrs. Sander).

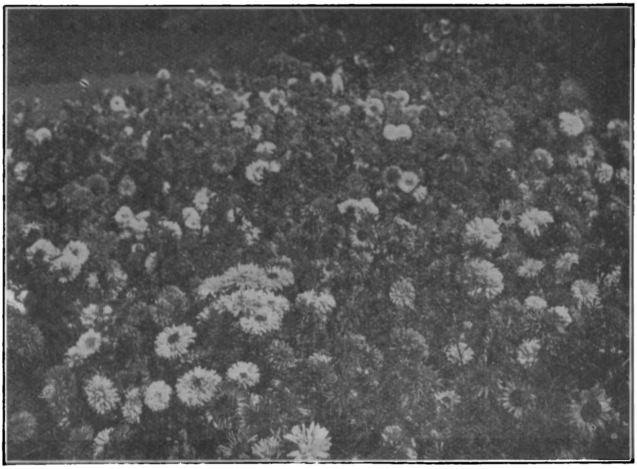
Sometimes, owing to extremely favorable climatic conditions, a Half-hardy Annual may become a Hardy Annual; that is to say, it may be planted in the autumn and will grow through the winter, flowering early in the spring, simply because of the absence of frost conditions in the weather.

"Biennial" plants are those which usually last for two seasons. They require two years in which to grow to maturity, to produce their flowers and fruits and to ripen their seed. Then they die. Generally Biennials are planted in the spring; they grow through the summer and subsequent winter, flowering the next spring. Sometimes, in favourable situations, they may be sown in January, developing good growth through the autumn and winter and flowering in the following season. Such are Canterbury Bells, Foxgloves, and Brompton Stocks.

Again, owing to favorable conditions certain plants which are true Biennials become almost Perennials. Thus Antirrhinums and Scabious are really Biennials, but sometimes the plants will live for more than the second season. It might be noted, however, that most of our Biennials succeed best if they are treated as Annuals and are replanted each year. Thus the constant planting of Snapdragon, Antirrhinums, Iceland Poppies, and Wallflowers will give very much better results, the seeds being sown no later than January and the young plants transplanted as soon as they are able to stand the operation.

"Perennial" plants are those which live more than two seasons, sometimes for three, sometimes for three thousand years, for many Redwood trees in California are of that age and even older. Sometimes several seasons elapse before flowers and seeds are produced; often they bloom quite early. The time at which the first blooms appear depends upon the individual constitution of the plant. Thus a Violet will bloom in its first season, while it may be many years before a Pine-tree will produce its blossoms. Trees of the Eugenia family have been known to wait forty years before flowering.

Perennials may be divided into two classes—Herbaceous Perennials and Woody Perennials. The Herbaceous Perennial is one which is raised from seed and after producing one or more crops of flowers in the first season, dies right down to the ground, leaving only a crown of buds and a mass of roots. This goes on each year, the plant with care lasting for very many seasons. Examples of herbaceous perennials are Delphiniums and Perennial Asters, or, as they are sometimes named, Michaelmas Daisies. Woody Perennials are such plants as the ordinary trees and flowering shrubs, which



A Fine Bed of Asters.

retain their growth above ground permanently. Perennial plants come under two classes—those which are evergreen, being clothed with foliage at all times of the year, and those which are deciduous, losing their foliage each year, generally in autumn. Evergreen trees as a rule shed their leaves, but the older leaves are not dropped until the newer ones are present in large numbers, and so the dropping is not seasonal but more or less continual.

CHAPTER VI.

PARTS OF THE PLANT

The relative importance of the various parts of a plant does not usually occur to the average gardener. Unless caterpillars seriously damage the foliage of his plants, he is generally content to let them alone; or if his Rose-bushes bear a crop of fruits or "haws," they are usually allowed to remain till they drop.

The well-being of every plant should be a matter of importance to gardeners, and every care should be taken to see that the ultimate object of the plants is attained in the highest possible degree. By "ultimate object" is meant the purpose for which the plants have been placed in the garden. It may be for the sake of their foliage, their flowers, their fruit, or their seeds.

Root-system.

A very important part of a plant, whatever may be the object of the grower in regard to it, is its root-system. It goes without saying, that the roots must be given perfect freedom and must not be interfered with in any way by hoeing or digging. The effect of cutting the roots of a plant is to check and stunt its growth, for it is hindered from collecting food in the form of sap upon which its life depends. This is especially important in regard to shallow-rooting plants, such as Oranges, Lemons and Dahlias. Hence all cultivation in the vicinity of such plants should be carried out with the fork or the push-hoe.

Leaf-system.

Apart from the root-system, the foliage of a plant plays the most important part in its life history, for in it the digestion of the crude sap sent up from the roots is carried out. By the action of the sunlight and air, the sap is changed in the cells on the leaves from "crude" to "elaborated" sap; and then it is sent back to nourish every part of the plant, building it up as it goes along. It gives growth to the leaves themselves; it builds up the buds on the stem; it increases the stem growth; it nourishes the bark; it builds the flower-buds and causes the flowers to grow; finally it nourishes and increases the root system. Breathing also takes place in the leaves, for the cells open directly into the air. This breathing is directly connected with the work of sap elaboration.

Thus the great importance of the foliage is obvious. A Sweet Pea or Chrysanthemum grower is anxious to have as rich foliage in quantity, quality and size as possible. He will accordingly feed his plants up to produce this foliage, and when it has been established, and the flower-buds reach a fair growth, the feeding is discontinued because his object has been attained. If the feeding be continued, coarseness and mal-formation of bloom will result, as the feeding was needed to produce foliage and not flowers directly. The foliage itself will do that work. The more vigorous the foliage the better will be the flowers or fruit. It follows, therefore, that undue interference with the leaves will result in decreased flower value. Hence, flowering plants and shrubs should not be trimmed or clipped, or deprived of their foliage in any way, before the flowering period.

Undue interference by insects, either by scale-insects or aphis sucking the sap, or by caterpillars eating the leaves, materially damages the leaf-system. Thus all insects attacking plants should be sprayed as soon as they appear.

Any soot or dust on the leaves should be washed or hosed off, to prevent the breathing pores from being blocked. If all these matters are attended to, a well fed and watered plant should produce its flowers in abundance. When the flowers have fallen, the plant may be allowed to harden. It possibly does not need such copious water supplies, or food supplies either, but the leaves must be allowed to mature without injury or interference.

The foliage of any bulbous plants should be allowed to grow as much as it will after the flowering season, for it is elaborating sap, storing it in the bulb, and so building it up for the next flowering season. This especially applies to Daffodils and Hippeastrums. The latter must develop good foliage from January to March, in order to have good blooms in the following early summer.

Fruit and Seed.

Then the question of fruit and seed arises. Their production calls for a very considerable amount of energy on the part of the plant, and, following as it does on the energy expended in flower-production, the call is a severe one. It is not wise, therefore, to allow the plants to produce fruit or seed, unless that is the object for which they are kept. In that case the plant would be pruned more severely at the pruning season, and less wood left on it. That is one reason why fruit trees are pruned more severely than garden trees or shrubs. If the fruit or seeds are not required the heads should be cut off as soon as the flowers have dropped. Thus the haws of the Roses, the fruits of *Pyrus japonica, Prunus mumè*, and others, should not be allowed to develop.

Sweet Peas.

When Delphiniums, Cannas, and the like have produced their trusses of bloom, the stems should be cut right away. When Sweet Peas are in full flower, they should be gathered, so as to prevent the formation of seed-pods. Thus with the careful study of each part of the plant, its aims and objects, and the protection and careful nurture of all, very much better results will come to delight and reward the gardener.

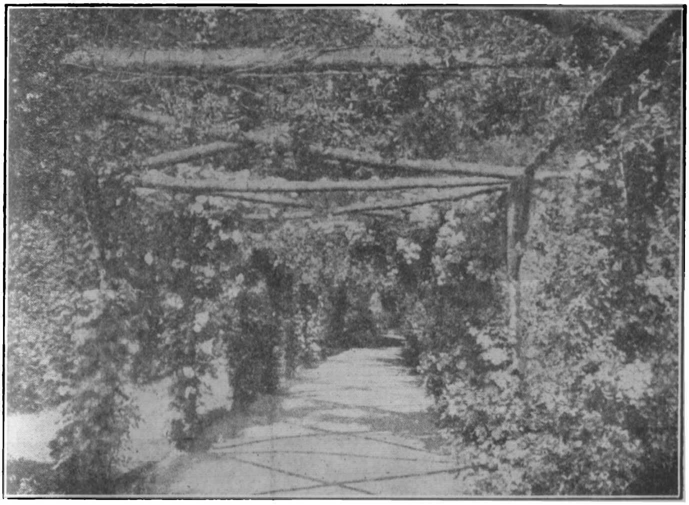
CHAPTER VII.

PROPAGATION AND REPRODUCTION

The work of plant-propagation is one of the most interesting of gardening operations to all gardeners, amateur and professional alike. The germination of the seed, the growth of the cutting, the "taking" of buds, the union of grafts—these and all other matters of interest are keenly watched, and discussed. None of the methods of plant-production or propagation may be termed "trade secrets," although some amateurs have this impression in regard to grafting and budding. But there *are* certain methods that are not available to the average gardener, and without these methods, or the apparatus appertaining thereto, it would be useless for anyone to attempt to reproduce certain plants.

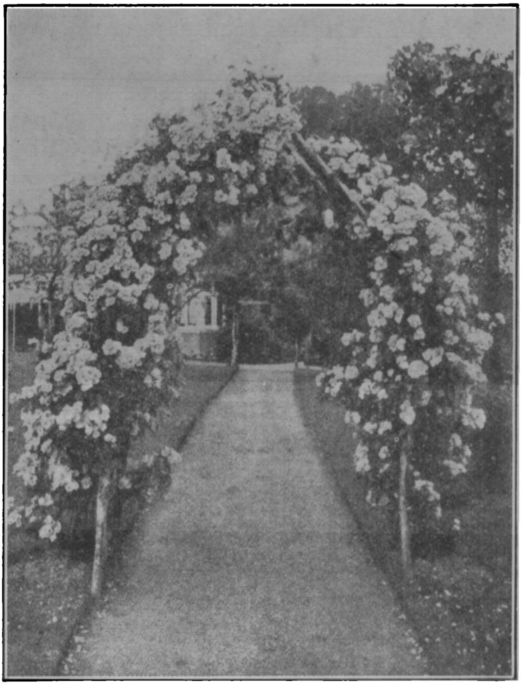
The growing of Ericas and Cypress from cuttings may be taken as examples. Nurserymen produce these in quantity from cuttings simply because they have hot beds, frames, or hot-houses; and without the possession of these, the reproduction of such plants is not at all easy.

For these reasons, many plants are not propagated by seeds. In selecting plants the flowers of which are to be saved for seed, it will be wise to select typical plants. Those which possess a robust habit of growth and foliage, and produce a fair supply of good, typical, well-shaped and brightly-colored flowers, are the best for seed saving. Any plants that show inferior growth, habit, or color, should be pulled out and destroyed; otherwise the bees and other insects in their indiscriminate carriage of pollen will be sure to pollinate the good blooms with pollen of the inferior strain.



A Pergola of Roses.

Then again very few plants "come true" from seeds. So many factors are at work to crossfertilise the flowers, and so to change the character of the offspring and give a new flower or a new plant. Thus, if the seed of the well-known hedge plant, *Pittosporum undulatum,* be planted, every seed that germinates can be relied upon to produce a plant practically like or "true to" the parent plant; but, if the seeds of a Jonathan Apple or a La France Rose be planted, there is the probability that the resultant plants will not only be different from the



An Arch of Roses.

parent plant, but also very different from one another. In annuals, too, this usually happens. If the seeds from a yellow Zinnia be planted, it may be found that many of the resultant plants will produce yellow flowers, but, unless the seed-flower has been protected from insect visitors, there will be plants with other colored flowers as well.

Reproduction of plants is assured from seeds and cuttings, or by the operations of budding, grafting, layering, inarching, and leaf and root propagation. In addition, bulbs reproduce by a division of the parent bulb, as in Daffodils; and also by the production of small "bulbils" on the stem, as in Liliums; corms by the production of small cormlets at the base of the old corm, as in Gladioli, or on the stem as in Watsonias; tubers and herbaceous plants by an increase in growth of the tuberous roots, or of the crown as in Dahlias and Cannas; certain plants such as Violets and Strawberries, by the growth and rooting of the runners; and other plants such as the Bamboo, by underground stems and roots.

Seeds and Seedlings.

The natural method of reproduction is by seed. The ripe seed is saved, and planted in due season, when the young plants appear and grow. But some plants do not produce seeds, or at any rate, rarely do so. Bamboos, for example, rarely seed,—perhaps only once in fifty or sixty years,—and, having done so, the parent plant usually dies. The Daphne has never been known to produce seed in Australia. In these plants, therefore, we look for other methods of reproduction, as will be shown later.

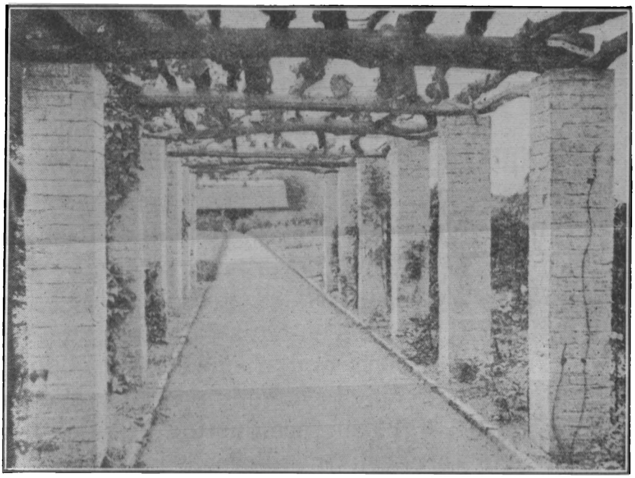
Again, seeds should *not* be saved from forced plants. Sometimes a grower will for show purposes, disbud his plants, forcing them to produce a few large flowers at the expense of quantity. In this case, the work of the plants is to produce *flowers* and not seeds. Seeds saved from such blooms will usually produce an inferior strain of plants.

Certain seeds require protection from birds. This is notably the case with such composites as Zinnias, Asters, Sunflowers and Marigolds. If seed-eating birds such as the Goldfinch are prevalent, the flower-heads should be loosely tied in thin muslin. It is a fortunate provision of Nature, that the seed of many of the Composite family, as well as several other varieties, may be gathered before it is ripe and dry, and then matured in a dry room or seed-house. Thus the evil designs of the birds may be easily and completely frustrated.

As a general rule seeds may be sown in a light free sandy soil, in which no manure whatever has been placed. Manure is not required for the growth of seed. After the young seedlings are established, they may be given manure, if it is their nature to require a rich root-run. Seed will usually grow better if planted in pots, pans, or boxes. These should be in a shady spot or covered with a frame of hessian.

In the case of delicate or obstinate seeds, a piece of clear glass should be placed on the top of the pot. When seed is sown in the garden in the place where the plants are to grow, better results will be obtained if a handful or two of sand be mixed with the garden soil. Such plants as Mignonette and Sturt's Desert Pea, resent transplanting, and their seed should be grown in the garden plot; and in that case the sand would assist their growth.

The reasons for using sand and no manure are these. Manure is usually too caustic for the delicate root-tip of the germinating seed; and to obviate the necessity for this, Nature has provided a store of plant-food in the seed itself sufficient for the production of the young plant. The sand provides a poorer and a warmer soil, and it also assists to drain the soil, so that the seed shall not be "drowned," or rotted by excess of water. Further, sand loosens the soil and allows for the admission of air, which is very helpful to the growth of the seed and the satisfactory development of the young plant. It



Pergola of Brick and Tree-Branches.

also allows of an easy transplanting, when the young plant has to be moved from the seed bed.

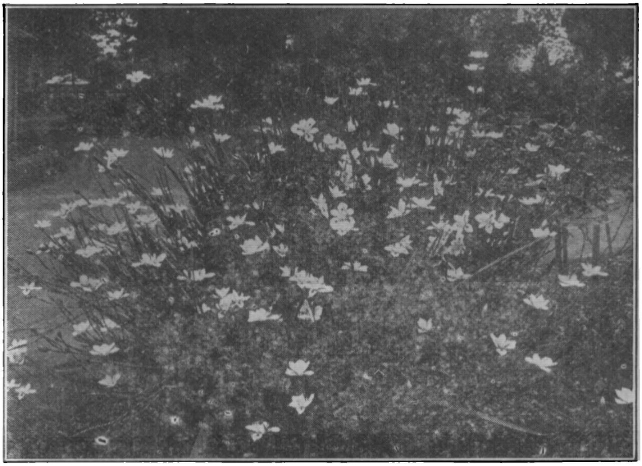
Sowing Seeds.

In sowing the seeds, care should be taken not to cover them too deeply. Generally, it is a safe rule to place the seed at a depth equal to its own size. Thus, while a Broad Bean seed may be sown an inch deep, the seeds of Shirley or Iceland Poppies should be scattered lightly on the surface. The latter should have a very light sprinkling of sand or peaty soil spread over the seed-bed. The soil should be moist, not wet, and only a slight watering should be given when the seeds are put in. Never at any time should seeds be overwatered. More seeds and seedlings are killed by mistaken kindness than by any other cause.

The soil should never be allowed to dry; it should be sufficiently damp, but never wet. The delicate seedlings are very liable to "damp off" if there be too much water in the soil. This "damping off" is really a fungus disease, and if one young plant be affected the disease may be communicated to the rest of the plants. A light surface dusting of sulphur or lime will help to check the disease, but it will be better to avoid the cause than to be compelled to apply the remedy afterwards. In using lime, care should be taken not to use it on plants that are lime-haters, as are Rhododendrons, Liliums, and Japanese Irises.

Transplanting Seedlings.

When transplanting the seedlings, it will be well to note that, while annual plants such as Pansies, Phlox, and Asters, may be planted direct into the garden, all seedlings of trees and shrubs, and herbaceous plants such as Eucalypts, Acacias, Tecomas, Pines, and Cannas, should be first hardened off by planting into small pots, from which, when well-established, they may be planted out in the garden. When plants are transplanted from pots, if the root-systems are congested, or "pot-bound," they should be lightly loosened and opened out with the finger and thumb before planting. All seedlings and plants from pots should be transplanted into moist soil, and they should afterwards be sprinkled and "watered in" with the watering-can. If the sun be warm, it will be advisable to shade them with some light twiggy foliage for a few days.



Garden Iris.

Hot-beds.

A hot-bed, for seed or cutting growing, is easily constructed if a supply of fresh horse-manure is available. A glass frame is required. This may be built of any timber, provided it is fairly air-tight. A suitable size would be about five feet long by three feet wide. The height should be three feet at the back and eighteen inches in the front. The framing may be of Oregon, and the sides of pine weather-boards, Californian or Red Pine. Lightwoods are better, as they are lighter in weight and more easily handled. The frame should be painted, and the sash for the top should be strongly made, glazed with good stout glass, and provided with a handle at the top and bottom. The sash should slide in a groove, and it must not be hinged, as it is often necessary to lift it right off.

The hot-bed is made by simply building each day in a square heap the fresh horse-manure obtained until it is a couple of feet high, turning it over, levelling it frequently, and well mixing the manure, so as to make the bed of an even temperature. When constructed, the frame is lifted on top of the bed, and a light bedding of sand, fine cinders, or spent tan, etc., is placed on the top of the manure. Such a bed, evenly built, should retain sufficient propagating heat for six weeks. The frame usually faces the north or east, and it is well to white- or lime-wash the glass from time to time. The glass should not be painted, as it is sometimes, especially in the winter, necessary to have it clear. It is an advantage to have a separate loose frame, covered with hessian, so that on an excessively hot day, the bed may be shaded by placing the frame on the top of the sash. When the manure from the bed has become cold, it may be worked into garden plots.

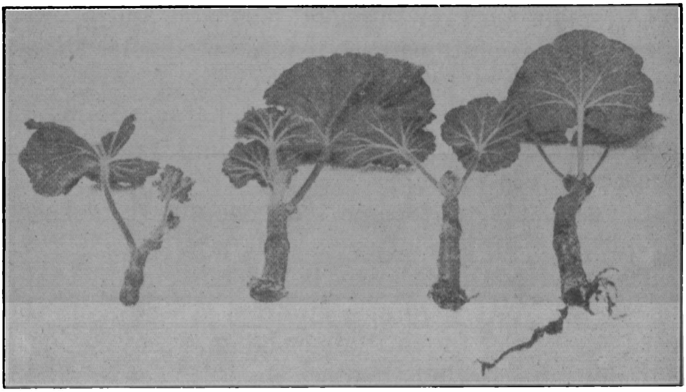
Cuttings.

Nature usually provides more than one method of reproduction. If one method fails, there is then a chance for success with the other. Thus we also propagate by cuttings, that is, a piece of the plant, usually a growth shoot, is cut off and planted under such conditions that it produces roots, and so becomes a new plant. In growing plants from cuttings, every plant retains the characteristics of, and becomes a duplicate of the plant from which the cutting is taken.

Some plants may come true equally from seeds or cuttings; in the latter case, it is often easier to raise cuttings than the seeds. Thus cuttings may be "struck" or rooted at a different season from the seed-sowing; or the latitude or climate may be more suitable for growing cuttings than for seed-raising.

With the exception of Annual or Biennial plants, almost any plants or trees may be raised from cuttings, and even these, too, may be at times grown from cuttings. Even such hard-wooded trees and plants as Pine Trees and Bamboos have been successfully raised from cuttings; but such tasks are only for the highly-experienced professional worker to carry out; usually they are very slow in producing roots.

In making cuttings, there are several types of growth or wood used, according to the necessity of each plant or the season in which the cutting is grown. Ericas are always struck from the growing tips, that is, the soft-growing tender tip of growth is cut off, and planted in sand. These cuttings are very small, usually being not more than half an inch in length. Hydrangeas are frequently grown in the same way; the tender young side-growth is cut and struck in summer. Such tender-wooded cuttings are usually struck under heat, and in sand.



Various Stages of Pelargonium Plant from cuttings.

If the growth of a Geranium or a Fuchsia be noted, the growing tip will be found soft and tender, with soft green bark. The base of the growth will be firm and hard, usually with brown bark. Between the two, the growth is becoming firm, and often pale brown in color. This is termed half-ripened wood, while the older and harder portion of the growth is termed the hard wood. Certain plants are struck from this half-ripened wood, and others from hardwood cuttings. Again, cuttings may be struck from the hard-wood tips, which have developed and ripened their growths throughout.

Most cuttings are successfully rooted in river or washed sand. The sand is washed by half-filling a bucket with sand and turning the hose into it. The water should be allowed to run moderately free. The sand should be stirred with a flat piece of wood, or with the hands, until the water, which is dirty at first, runs through quite clear. In this way all humus or organic matter, as well as all mineral salts, are washed out.

In rooting cuttings, they are more readily grown and more easily controlled if grown in pots. The pot is washed clean and a small broken piece of pot placed over the drainage hole. More crocks are placed in for drainage, and then some fine cinders. On top of these may be placed a few dead leaves or spent tan, or a piece of hessian folded over will answer as well. Then the sand is firmed and watered in.

For the planting of the cuttings a round piece of wood called a "dibber," about nine inches in length, pointed, and a little stouter than an ordinary lead pencil, is used. A hole is made with the dibber, the cutting placed therein, and the sand firmed around it. When the pot is full, the whole is slightly watered. Cuttings should be taken from perfectly healthy and sturdy plants.

There are two obsolete rules in regard to cuttings, which must be avoided. Formerly, it was thought that to ensure success it was necessary to have a "heel" on the cutting. The cutting, or as it was called, the "slip" was broken from the plant with a heel of bark attached. Because frequent success resulted, this was accepted as the correct thing to do. The success, however, was not due to the "heel," but to the fact that such side-shoots were the best possible wood for cuttings. Frequently the "heel" will rot, and the rot will spread through the whole piece, killing it quickly. Then, in planting, the cuttings must be planted upright, and not sloping, as was formerly the custom. A cutting that is planted upright will produce an even and complete root system, the roots going directly downwards.

In making, say, a Pelargonium cutting, a piece of ripened or half-ripened wood is selected. Most of the leaves are trimmed off, leaving a very small amount of foliage at the top. The places on the cutting from which the leaves grow are called the "nodes," and it is at one of these that the cutting must terminate. With a sharp knife, the cutting is trimmed cleanly and right across at the node. The nodes are the only places, with rare exceptions, from which roots will grow. If the cutting be trimmed between the nodes, and planted, the wood will rot to the node, and perhaps, before the node has an opportunity to emit the roots, the rot will extend throughout the cutting, which will, of course, die.

The growth of cuttings may be explained as follows. Between the bark and the wood is a quantity of digested or elaborated sap. As soon as a wound is made, as at the base of the cutting, this sap moves downwards to heal the wound. In the healing-over or cell-making process, the whitish tissue which is formed is termed the "callus," and from the callus the roots grow. The callus may readily be seen by taking up a cutting which has been planted about three or four weeks. Sometimes a cutting will make a callus which hardens quickly, but which will not send out roots. In that case, the callus may be lightly scraped and the cutting again planted. Usually roots will develop from the wounded callus.

A Good Hydrangea Bush.

Rose-cuttings are made in the same way as those of the Geranium, but the foliage is usually removed. Usually two-thirds of a cutting are placed below the ground.

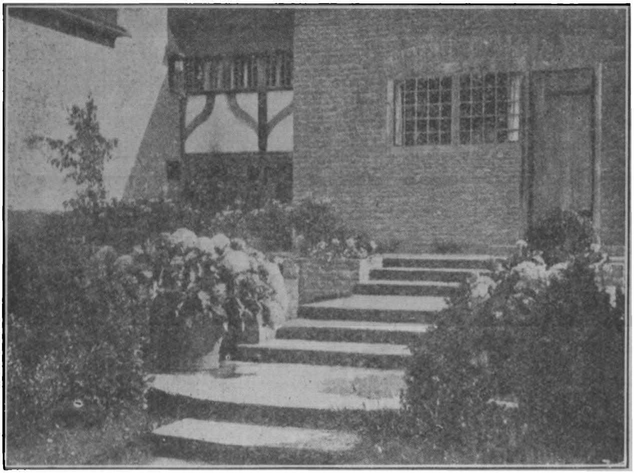
The propagation of plants from leaf-cuttings, is confined to succulents, that is, such soft-wooded plants as Begonia, Streptocarpus, Gesnera, Gloxinia, and Hoya. The leaf- stem of the Begonia is simply inserted in the sand, the mid-rib and main ribs of the leaf having been severed in three of four places at the back of the leaf with a sharp knife. The leaf is lightly pegged down, or weighted with a light sprinkling of washed sand. Young plants will then grow from the places where the veins were severed. This method of propagation is to be practised only under glass.

For root-propagation small pieces of root are cut, two or three inches in length, and planted in sand or light peaty soil. They will soon produce young plants. By this method, Aralia, Crotolaria, Bouvardia, Dais, and many other plants, are readily multiplied.

The growing of plants from suckers, such as Lilacs and Chrysanthemums; and from runners, such as Bamboos and Strawberries; is easily effected by taking up suckers or runners from the main plant, trimming them back, removing some of the foliage and planting either in pots or in the garden.

Large portions of the stems of certain plants are sometimes taken and grown as cuttings. These large pieces are called "truncheons." They may be taken from the old stems. Such truncheons are often two or three inches in diameter, and from nine to twelve inches long. They should be planted leaving only an inch above the ground. Willows, Poplars and Olives are propagated in this way.

Single-eye cuttings are sometimes grown, when wood of the desired plant is scarce. A piece of the stem is cut having one eye only. This cutting is quite short, having the wood only long enough to hold the eye or bud. This cutting should be propagated in washed sand, in a pot, where its development can be easily observed. Vines are very readily increased by this method.



Steps instead of a Path.

The average time for propagating cuttings is in the early autumn, although soft-wooded cuttings are often propagated in spring and early summer.

Budding.

Of the two methods of budding and grafting, budding is the more economical; for, in budding, each separate bud may be used to propagate a new plant, while, on the piece of wood that is used for grafting, there may be three or four eyes or buds. Some plants may be budded as well as grafted, and also struck from cuttings. Roses may be reproduced by any of the three operations.

The "buds" or "eyes" used for budding are to be found on the stem right at the base of the leaf-stem, or the node. These buds are slightly pointed and rounded in shape. Later on these would grow, developing into shoots carrying foliage and flowers. If each bud, with the leaf removed and a small portion of the surrounding bark retained, be placed underneath the bark of another rose-bush, it will, under certain conditions, grow and, when the growth flowers, it will produce blossoms exactly like the bush from which it was taken, and which is called the parent plant.

It is well-known that Roses do not "come true" from seed. That is, if rose-seed be planted, the progeny will not be at all like the plant or flower that produced the seed; indeed it is usually very different. There are many other plants that present this same difficulty, notably fruit-trees of all kinds, and most plants having a variegated foliage. There is a law in Nature which must be observed in budding: namely, that plants must be budded on to another plant that is a close botanical relation to itself. Thus we bud Roses on to Roses, Apples on to Apples, and so on. Sometimes the rule may be somewhat varied, and Apples may be budded or grafted—or, as the nurseryman terms it, "worked"—on to Pears, or Pears may be worked on Quinces; and Lilacs may be grafted on to Privets;

but in all of these cases, the relationship is still very close.

When these operations are being carried out, the plant which is rooted and growing, and upon which the bud is to be placed, is called the "stock," and the bud (or graft) is called the "scion." The place of joining is called the "union."

Budding is usually carried out in late spring and early summer, either in November or February, and sometimes even as late as March. If Roses be budded in November, there is then a chance for the buds to develop and to grow into strong plants, ready to transplant in early winter. To bud successfully, or as it is termed, to get the bud to "take," the sap in the stock must be flowing freely. It is, therefore, usual to water the stocks or the stock-plant well, two or three days before the budding is performed. When the sap flows freely, the bark will readily lift from the wood during the operation, and without tearing. Before budding, it will be well to make a short incision in the bark, and note that it separates readily from the woody stem. In that case, the stock is ready for budding.

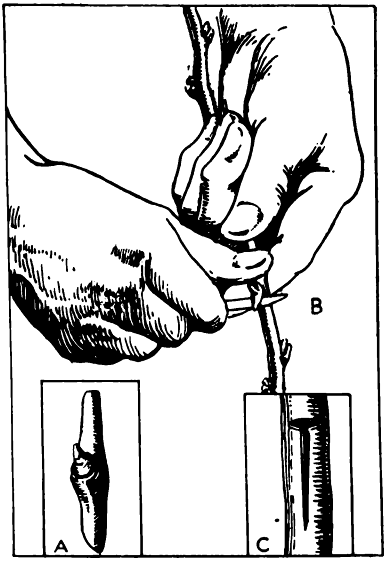
Buds selected for budding, should be taken from a growth of the present season, one that has developed since spring. The wood from which the buds are to be taken must be firm and well ripened. Only the middle two-thirds of the buds must be used. The buds at the base of the shoots must be discarded, as being too hard; and those at the end must also be discarded, as being too immature. The selected buds should be plump and well-nourished, without any signs of breaking into growth.

The method of budding is illustrated in the diagrams. There are two operations. First, the bud must be cut from the stock. The piece of wood upon which the buds are placed should be cut from the parent bush. Then the foliage should be trimmed off, leaving about half an inch of the leaf stem. The sharp budding-knife is then placed about quarter of an inch above the bud and almost flat against the stem. The bud and a thin slice of bark is then sliced off, taking none of the woody-stem with it. The whole piece sliced off need not be an inch long: it must be cleanly and sharply cut, and to that end the knife must be very sharp. Much practice will be required before buds are successfully cut off.

Slicing or cutting the bud is more readily performed by holding the wood in the left hand, and then, by placing the thumb of the right hand firmly below the bud, holding the knife firmly in the fingers and palm and slicing or cutting downwards, with a movement parallel to the stem. After cutting the buds, and before inserting them in the stem, they must not be allowed to become dry. They may be held in the mouth, or in a piece of damp cloth.

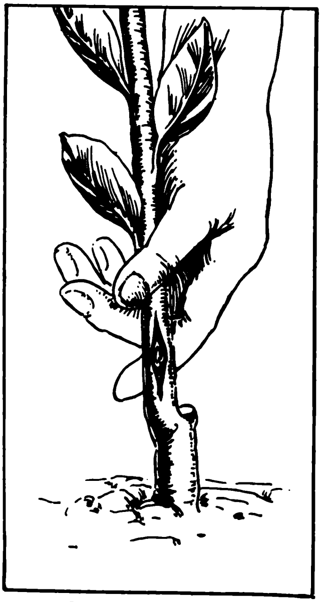
Then a T shaped cut is made in the bark of the stock for the insertion of the bud. The knife is held in the right hand in the same way as for cutting the bud. The horizontal top of the T is readily cut, cutting it in a slightly circular fashion, pressing on the stem with the ball of the thumb. This cut need not be an inch long. Then commencing from the centre of this cut, a downward cut is made, still holding the knife in the same way, and pressing the side of the stock with the thumb. This vertical cut should be slightly longer than the horizontal one. The T, if the bark runs or opens well, should readily lift at the junction of the cuts.

The bud is then fitted in and pushed down until it is right under the bark. The T, with the bud, should then be firmly tied with raffia, completely covering over the wound, but leaving the point of the growing bud and the leaf-stem protruding.



A. The bud. B. Cutting the bud. C. The cut.

The plant should be kept watered; and at the end of three weeks if the leaf-stem falls at a slight touch, the bud may be considered to have "taken." The tie can be loosened at the back by cutting one strand; and in two or three weeks more, the stem above the new bud may be cut off, leaving the bud as a terminal, whence it will quickly grow into a new shoot.

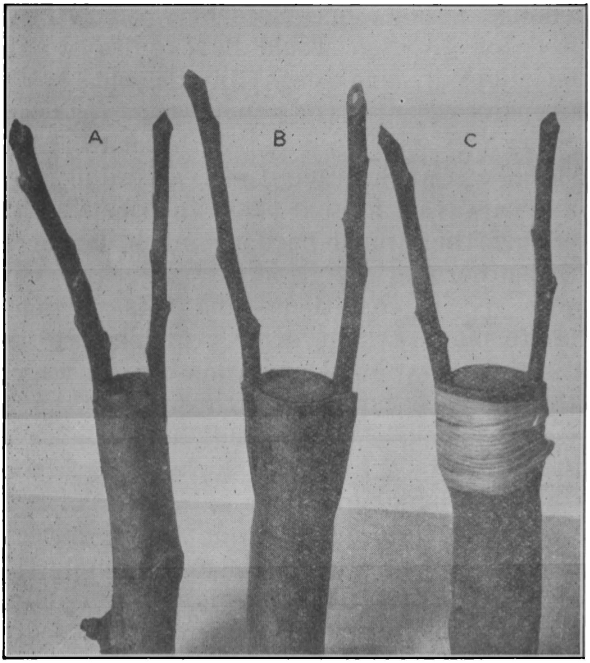


The Bud inserted.

Grafting.

Grafting is another operation that is carried out so that certain plants may be perpetuated, which will not come true from seed, or which will not make a vigorous root system of their own from seeds and cuttings. Thus a variegated sport may be perpetuated from cuttings and by budding or grafting, but if the seed produced by such a plant be sown, the resultant plants will usually have green foliage.

Regarding the question as to which of the two methods of reproduction to adopt, budding or grafting, there are several points to consider. Budding is usually done in the growing season, from November to March, while grafting is generally done at the close of the dormant season in early spring;

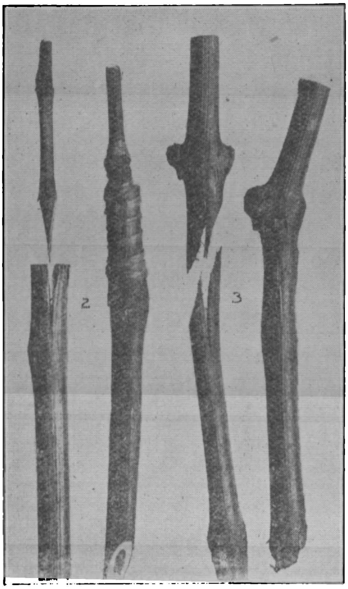


A. Wedge graft (not recommended).
B. Crown or bark graft.
C. Graft tied with raffia before waxing.

whichever operation happens to be seasonable can be carried out, and if it fails only half a season goes by before the other operation may be performed. Where equal results may be obtained from either grafting or budding, the preference is usually given to budding, because one piece of wood that would be used for grafting would have quite a number of buds on it, and each bud could be used for a separate plant. The general time for grafting is in very early spring, so that the end of August would be a fair average time, according to the climate; always noting that in the Northern States, grafting would be done much earlier than in the Southern.

Under special conditions—and this particularly applies to plants which, after grafting, are grown for the time being in the hot house or in frames—grafting may be carried out throughout the year. The term "stock," "scion" and "union," are used with the same meaning when applied to grafting as they have in budding. The sap must, of course, have commenced to flow in order to have successful grafting. The operation consists in simply taking a piece of wood of one variety of plant, trimming it, and fitting it on to a rooted plant. After fitting, the place where the two pieces meet is made air-tight, and tied firmly for support.

As with budding, plants to be grafted must be closely related; thus Apples are grafted on to Apples, Pears on to Pears, Roses on to Roses, and so on. Sometimes Pears may be grafted on to Quinces, but in any variation of this kind there must be an affinity between the plants as well as a close botanical relationship. Then, again, certain plants have individual characteristics. Thus some varieties of Apples and Pears will not take or thrive on one another, but on other varieties they grow remarkably well. To the ordinary observer, there does not seem to be much relationship between the Privet hedge and the Lilac bush, but the Lilac is usually grafted on to the Privet so that quick-flowering results may be obtained.



2. Wedge or cleft grafting.
3. Saddle grafting.

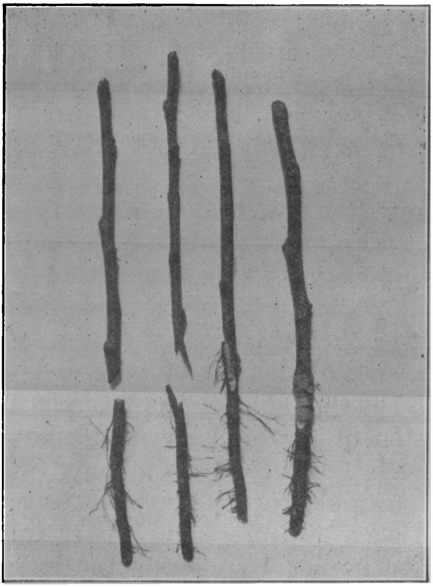
In grafting, mature but not old wood should be used. The middle portion of the past season's growth is generally the best wood for grafting. The base should be discarded because it is usually too old, and the tip should be removed, as the growth is not sufficiently hardened. When the stock and scion have been fitted together and the air excluded, the wound heals. It heals by a callus which forms in much the same way as that described under the growth of cuttings.

There are various methods of grafting, and these may be separated into two groups. The first group includes grafts which are worked when both stock and scion are of equal size. In this case the stock and scion are measured, so that the two pieces will be of the same thickness. A long sloping cut is made on each one, and about the centre a small upward nick is made. Each one of these is then fitted into the other, so that one grips the other. They are then tied firmly with raffia or with soft string.

Root-grafting.

Sometimes plants are propagated by grafting a piece of root on to a short scion. This is called "root-grafting." Nurserymen usually propagate Wistarias in this way. A nice piece of wood of last season's growth is taken and cut in the method described. Then a piece of Wistaria root is removed from a growing plant and cut in the same way. The two are fitted together, tied, and planted.

Sometimes the scion is to be grafted upon a young seedling. In this way seedling Cypresses and Pittosporums are used to work different varieties upon. The seedling is cut down quite close to the ground level. A piece of "wood" of the same diameter is selected, both of which are trimmed and shaped in the method described, fitted together and then tied.



Root-Grafting with the Tongue Graft.

"Crown" or "Bark" Grafting.

If grafting older trees is to be done, that is, if the stock is very much larger than the scion, several methods may be adopted, but the easiest one is that known as the "crown" or "bark" graft. Thin pieces of wood are selected to be used as scions, one end of which is trimmed to a flat face. A slit is made in the bark of the stock, the latter having previously been cut right down, and the bark is opened to admit the scion. The trimmed face of the latter is then placed against the wood which has been exposed by the opening of the bark. Care should be taken that none of the bark is removed.

Sometimes quite a number of grafts may be inserted in the one stock, and this number depends upon the diameter of the stock itself. After the insertion of the scion, the grafts are firmly tied round with raffia, which is the best tying medium.

Grafting Wax.

Where any grafting is done above ground, it is advisable, after tying, to coat the tie and the wound with grafting wax. This is made of equal parts of tallow or lard, beeswax and resin melted together, and allowed to cool. The wax may then be readily worked with the fingers and thumb and rubbed into the tie and over the wound. It prevents the admission of air to the wound, and being also antiseptic, a quick heal results.

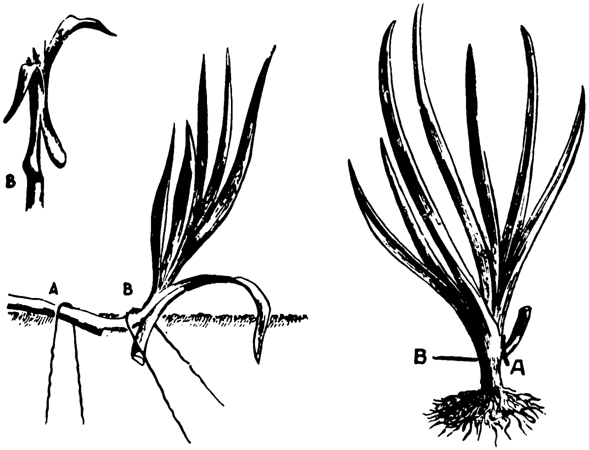
Another formula for making grafting wax is:—1 part beeswax, 1 part resin, ½ part tallow and ½ part lard. The parts are measured by weight. In either case, neither the tallow nor the lard should have any salt in it.

If the grafting is done in the open and birds are plentiful, a number of long sticks should be tied about the grafted plant, the sticks being longer than the scions, so as to prevent birds from roosting on the scions and displacing them.

About a month after grafting, the ties may be cut on those plants which have been grafted above the ground, so as to allow for the swelling of the wood and the bark, but in the case of root-grafting this operation is unnecessary, as the tie will very quickly decay underground.

If the bark of any plant be lifted carefully, it will be noticed that the wood underneath is usually sappy and very soft. This layer of wood, which is next to the bark, is called the "cambium" layer, and through this the healing sap passes. If a good union is to be obtained, as much as possible of the cambium layer of the scion must be placed

Layering a Carnation.



1. The stem split.
2. Pegging-down the layer.
    A. Peg wrongly placed.
    B. Peg rightly placed.
3. Rooted layer ready for planting.
    A. Part of stem to be cut off.
    B. Depth at which to plant.

against the cambium layer of the stock. If the two cambiums are placed exactly together, a free flow of the sap is allowed from one to the other and healing takes place quickly.

Sometimes clay is used as a medium for preventing the admisssion of air into the graft, but as clay dries out very quickly frequent failures occur.

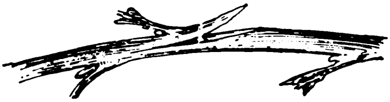
Wedge-graft.

The old wedge-graft, which was performed by splitting the stock right across and driving a wedge-shaped scion into the split stock, has now been discarded in favour of the bark-graft. The main objections to the wedge-graft are the difficulty of getting the two cambiums to coincide and also the frequent rotting of the stock itself, due to the admission of air into the wound.

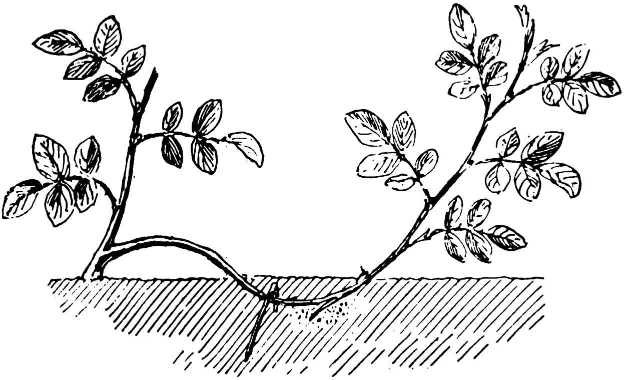
Layering.

The propagation of plants by layering is effected in the case of growing plants which are not readily propagated by other methods, or which respond to this method more readily than any other. It is perhaps the most simple of all reproduction methods. A branch or stem of the growing plant is simply pegged down, having a portion of its stem under the soil, and the growing end above. The stem is slit or slightly cut at a node or a leaf-angle, on the underside of the stem which is underground. A small peg for layering may be cut from a firm-stemmed plant; the pegging being for the purpose of keeping the branch or shoot under the soil. The wound is healed by a "callus." from which roots come. Roots may be discovered by working among the soil with the finger and thumb.

As soon as a root-system has been well developed, the rooted shoot may be cut from the parent plant, and potted up for a week or two till the new plant is firmly established.



A Stem cut for Layering.



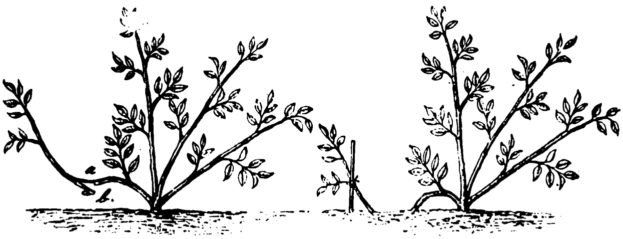
A Stem Layered in Sandy Soil.

There is no fixed time for layers to root. Quick-rooting plants like Carnations will root in mid-summer in about three weeks; while Daphne layers may not root for many months.

Aerial Layering.

Perhaps the plant to be multiplied may be too tall to have its growths layered into the soil. In this case, pots of soil may be tied to stakes or among the branches, into which the layered shoots may be pegged. These will need frequent attention to see that the soil is kept moist.

Aerial layering is performed on plants, often pot-plants that have become too tall or "leggy." These plants usually have a single stem without side-branches. Such become unsightly when they grow tall. Dracaenas and similar plants are operated upon. The bark is slit or nicked in two or three places, just below the tuft of foliage. A handful of moist sphagnum moss is then tied around the stem, over the cuts. Sometimes the moss is sprinkled with sand before tying; sometimes a pot is cut in halves, with the drainage-hole enlarged, and tied round the moss, or it is tied on the stem and filled with sand and leaf-mould. Roots quickly come from the wounds, and when they show through the moss or the bottom of the pot, the stem may be cut through below the ball or pot, and the new plant potted up into a larger pot.



1. A Stem prepared for layering.
(a) Method of forming the tongue (b).
2. The Layer staked and pegged down in soil.

Hill Layering.

Sometimes the method of "hill layering" is practised with Carnations. All of the stems are cut lightly, and then soil is heaped around the plant, until it has the appearance of a number of shoots growing out of a small hillock of soil.

CHAPTER VIII.

LAWNS AND LAWN-MAKING.

Practically every garden has an area of grass, which is usually dignified by the name of Lawn. The question is often asked, what is the best grass? The reply is that there is no best lawn grass. Sometimes the particular grass or mixture chosen is a matter of individual taste, and at other times the matter is decided by soil and other local conditions.

Buffalo-grass.

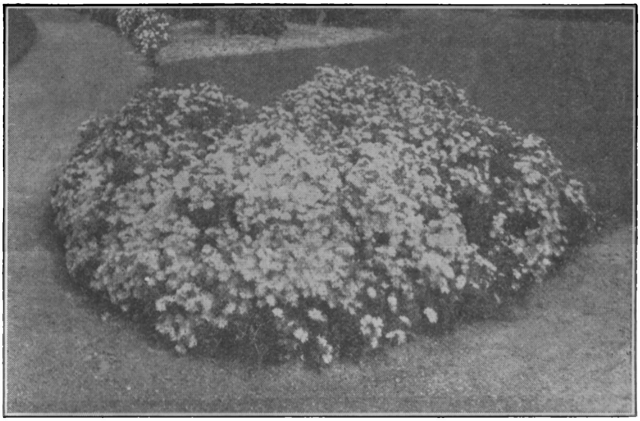
Buffalo-grass is the grass in most general use in Australia. The introduction of one small surviving plant of this grass from South America to the Botanical Gardens of Adelaide, fifty or sixty years ago, by the ship "Buffalo," is a matter of history. From that small plant the grass has spread all over Australia, and is perhaps the most popular of lawn grasses. The reasons probably are that it is easy to grow, it requires little attention, and generally looks well.

There are, however, one or two disadvantages connected with Buffalo-grass which must not be lost sight of. It the heaviest of all lawn grasses to mow. Its foliage practically dies off in the winter in cold or frosty areas, so that a lawn formed entirely of it is exceedingly untidy and unattractive in that season; but its hardiness and the way in which it will stand a large amount of traffic, make it a grass that cannot be entirely overlooked in making a lawn. The best lawn will probably be produced by a mixture of grasses. Buffalo may be used as a base, and other grasses be also sown so as to form a lighter mixture to take away the coarse appearance that Buffalo foliage has in the summer, and also to provide a green lawn in the winter-time. Of course, if a green sward is required in the latter season, lawn-mowing must be continued throughout the year, although naturally the labor of mowing is very much less in winter than during the warm seasons.

Couch-grass.

Couch-grass is often used either alone or in mixtures with other grasses. It is open to the same objections as Buffalo, in that it browns badly in cold and frosty localities. Otherwise it is a fine lawn grass. It requires far less water than any other grass. In Sydney there are some wonderful lawns consisting exclusively of it. I have seen in dry sandy areas some sports' lawns of Couch which were beautifully green in summer and yet received only a minimum amount of water.

A combination of grasses, either with or without Buffalo, would include Creeping Bent, Couch, Chewing's Fescue, Kentucky Blue, or the English Wood-meadow grass. Any or all of these may be used in lawn-making, and the last-mentioned is especially useful in shady situations, either at the back of hedges or under trees. The use of Perennial Rye grass is common, but it has a tendency to form clumps, and if sown with Buffalo, it is frequently completely killed out by the strong summer growth of that grass. Although it will form a fine sward on heavy soils, its use is often a temporary expedient, especially on light sandy soils, while the other grasses named may be relied upon to give permanent and superior results.



A Lawn Point of Mesembryanthemums.

Too much emphasis cannot be laid upon the fact that it pays to lay down a lawn thoroughly well in the beginning. In the first place, a lawn is intended to be permanent, that is, to stand for, say, twenty years at least. During all this period, too, it has to be able to stand constant traffic. A final argument rests in the fact that to re-turf a badly-made lawn will be found to entail almost as much labor as making a new one. The best-laid lawns will, of course, require occasional top-dressings, but if a lawn is badly constructed at first no amount of top-dressing or renovation will make it satisfactory.

Drainage of Lawns.

The first necessity is good drainage. So much watering is carried out in summer and so much rain falls in winter that very heavy supplies of water are given to the grass area. If arrangements are not made to carry away the surplus, the lawn will always be in a soppy condition. This will not only interfere with the health and vitality of the grass, but the traffic on the soft wet soil will result in an uneven surface.

Cultivation.

The second consideration is the richness of the soil, which is important in view of the long life of the lawn. The grass-roots feed permanently on the soil area and it should therefore be rich in plant food. The area should be thoroughly dug over according to the depth of the surface soil. If this is shallow, some of the underlying clay or rubble must be removed and fresh soil added to take its place. On no account must the clay be brought to the surface. No grass used for lawn purposes has been known to thrive in clay; so that the depth of the surface soil must be considered, and the digging regulated accordingly. It will be better to trench the area thoroughly well and, in the cultivation of the top-soil, to mix with it a fair amount of some animal manure. In addition to this, a little bone-dust and blood-manure, say about two ounces per square yard sprinkled over the surface, will make for better and quicker growth when the lawn is planted or sown.

It is very important that the cultivation should be thorough. The whole of the ground should be well broken up with mattock, hoe, or spade, so that no clods are left. It should be well raked over and levelled, and then rolled to consolidate the soil and give it an even surface. Unless one is an expert with the spade, it is not at all easy to dig consistently; so that after the area has been rolled and cross-rolled, the surface will be more or less uneven. These hills and depressions should be reduced with the hoe or levelled up with fresh supplies of soil. Then the rolling should be repeated. In this way by the successive operations of cultivating, rolling and levelling, an even bed of soil should be produced. Not only will the surface be level, but the consistency of the soil and the general building-up of the area will be uniform. The soil is then ready for the reception of the seed.

If Buffalo-grass be intended as a basis, this should not be planted until spring. It has been previously noted that Buffalo is only a summer grass, and it does not grow at any other season. The period of growth commences late in August, according to the climate, and hence the sets should be planted a little later than that time, setting them out in even regular rows, 9 inches apart each way. This distance allows for hand-hoeing for the first few weeks after planting, so that the crop of weeds may be kept down; but as the runners reach out in all directions, hoeing the weeds must be discontinued and hand-weeding resorted to. If the runners do not root readily, but stand up at all, they should be pinned down with small twiggy stems.

If the weather be dry, the lawn must be well watered, and as the watering very soon settles the soil and gives a smooth, even surface, an occasional light stirring of the soil with a small hand-fork may be found necessary. If this is not done, the sprinkled water will merely run off the surface, or it will settle in pools or depressions, and all parts of the lawn will not receive an equal supply.

Sowing Lawn-grass.

The sowing of lawn-grass is best carried out in the early autumn. If a thorough preparation of the soil is made some time previously, say in the spring, most of the weed seeds in the soil may be induced to germinate during the spring and summer and be got rid of by occasional light hoeings. Thus the trouble of weeds in the new lawn may be almost entirely prevented. After each hoeing, the lawn would, of course, require levelling and rolling. Before sowing the seed, the surface should be lightly hoed and then raked into a condition of light tilth. Such a condition would leave a certain amount of roughness of surface, which would provide for the reception of the seed. A calm day should be selected for sowing the seed, which may be sown at the rate of one to two ounces per square yard. If the day is at all windy, the seed is blown about and settles unevenly, so that a second sowing becomes necessary later on.

After sowing, the soil should be raked over lightly to settle and distribute the seed. Then a rolling would settle everything, and nothing further would be required until the grass-seed has germinated. If it were found that the sowing had been irregular, and that certain parts were showing bareness, these could be lightly raked over and a second sowing given as quickly as possible, so that the older parts of the lawn would not have much chance to make a growth ahead of the later sown parts. During the growing a special watch should be kept for the growth of weeds, such as Dandelions, Plantain, Cape-weed, and Chick-weed. These weeds grow quickly in the autumn, and with a much greater rapidity than the grass, so that in a short time even a few plants of them, by smothering out the grass, would spoil the general effect of the lawn. The keeping of the lawn free from these and other weeds in the early stages will save a good deal of trouble later on.

For two or three times, at intervals of a fortnight, after the grass has germinated, the lawn should be well rolled, so as to cause the grass plants to stool or spread, and grow more compactly. The rolling is better done if carried out diagonally; that is to say, the lawn is cross-rolled diagonally in even sections, the rolling itself afterwards being gone over at right angles. Rolling a lawn in the initial stages is far more important than mowing.

The newly-sown grass should not be mown too early, as the surface has not had sufficient time to consolidate, and broken strips are created by the uneven weight of the mower and its wheels. The making of such ruts should be avoided, and the rolling of the lawn several times prior to the first cutting will check the long growth of the grass.

When the sward is well established and there is a tendency on the part of the plants to produce long foliage and especially to send out flower-spikes, the lawn should be mowed. When once cutting has commenced, it should be carried out with considerable regularity. Never at any time should a lawn be allowed to run to seed, as this produces a tussocky growth which gives unevenness to the surface, and is always the forerunner of deterioration.

Lawn-mowing.

The mowing of the lawn is not the haphazard operation that it is frequently considered to be. The work should be done just as practically and carefully as the planting of a lawn. Mowing should never be done twice in succession in the same way. The first mowing should be done in one direction and, as soon as it is finished, the mower should be run over the lawn at right angles. In the next cutting the mower should be again run at a different angle, this one being crossed again at right angles; so that, if the first cutting is made parallel with the edge of the lawn and the second one across that, the third one will be a diagonal cutting, and the fourth one, being at right angles to it, will be also diagonally across the first two. By following this plan a more even surface is kept up and a better growth is maintained.

The question frequently arises in the mind of the cutter as to whether the lawn-grass should be removed after mowing. Unless very excessive growth has been made it is not at all necessary to remove the clippings from the lawn. These may be allowed to remain and they will very soon settle down amongst the grass, rotting quickly and eventually forming plant-food for it. On bowling-greens, tennis and croquet-lawns, and similar places, it would of course be necessary to remove the clippings after every operation.

Roses bordering the Lawn.

Watering the Lawn.

The watering of a lawn is a work that is sometimes not understood. Owing to the fact that the grass forms masses of matted fibrous roots very close to the surface, it frequently happens that, with a light watering or a light shower of rain, the water does not penetrate into the soil but merely runs off. Hence, if watering is done at all, it should be done thoroughly. It should also always be done after, and not before, cutting.

Turfing.

The operation of turfing in making a lawn is one that naturally gives the quickest results. Somewhere, possibly, the owner has been growing turf or a lawn which he does not need, or perhaps he has been growing it specially for the purpose of turfing. The growing grass is simply cut into strips and sections with a spade and lifted with about an inch of soil. These turves lift very readily, and when set in the new area, form a lawn immediately. The spaces between the turves having been filled with good soil, the turves should be well trampled down and levelled.

Top-dressing.

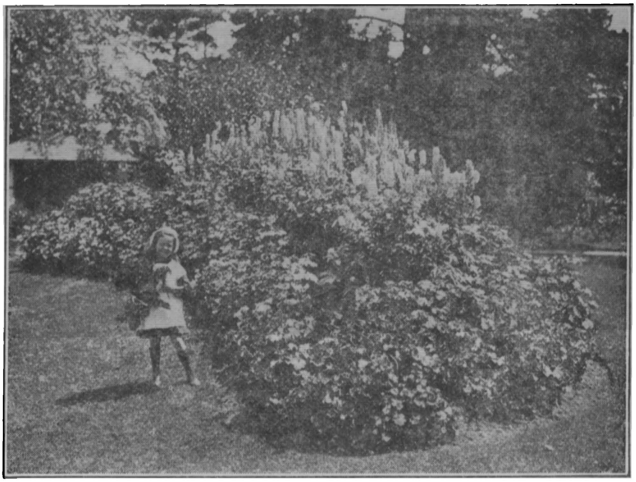
The renovation or top-dressing of a lawn is a question that has often to be considered; but it might be said at the outset, that if the lawn has been thoroughly made in the beginning and the soil well manured according to the directions given, it will require far less top-dressing or renovation than it would otherwise do. However, it may be necessary at times to renovate a lawn, especially if it be an old one. The period for top-dressing depends again on the type of grass used. If the lawn consists of Buffalo or Couch grass, the top-dressing will be carried out in early spring; if it be of any other grasses which have been raised from seed, the top-dressing will be done in early autumn. Top-dressing Buffalo lawns in autumn will result in killing a number of the growths.

Preparation for top-dressing the lawn should be made some months ahead. A supply of good, old, manure and, if possible, new soil, should be heaped somewhere in the background. As the weeds commence to germinate in this heap it should be turned over, and the operation repeated till the danger of introducing weeds into the lawn by means of the top-dressing material is minimised. If old sheep-manure can be obtained it is quite the best material to use. In heavy soils, pure sand often makes an excellent top-dressing.

After months of turning, as the top-dressing season approaches, the material should be well sifted to take out all lumps, sticks, and other coarse substances. If the soil obtained is not sufficiently fine, the sifting will have to be done a second time. Then the sifted soil should be spread evenly over the surface of the lawn and raked well in. Care should be taken that the grass is not covered by the top-dressing, but that everywhere the blades are peeping through it.

If the lawn is in a rather bad condition and urgently needs top-dressing, it will be a good plan to give a light sprinkling of bone-dust to the grass, say at the rate of about 2 ounces per square yard, before the top-dressing soil is put on.

If the lawn has reached such a stage that even top-dressing may not do it very much good, then severe measures must be taken. It is useless tinkering up a very old and weary lawn, as the work will need to be done repeatedly. The only thing to be done is to cut the grass into shapely turves, lift them up, and stack them away somewhere while the remaining surface-soil is being thoroughly dug over and enriched by an abundance of well-rotted manure that has been kept free from weeds. After these operations have been completed and the soil subsequently sweetened with a top-dressing of lime, the turves may be put back and rolled and levelled into a perfect surface.



A Raised Bed on the Lawn.
(Delphiniums and Zonale Pelargoniums).

The problem of worms, cockchafers and caterpillars in lawns is occasionally a serious one for gardeners, but the frequent use of lime for top-dressing, particularly in autumn, will help to keep the lawn free from these destructive pests.

Weeding.

Weeds in lawns are a cause of constant trouble to the gardener. Such large growing weeds as dandelions and cape-weed, must be lifted out individually, or, as the operation is called, "spudded out" with a small implement specially designed for the purpose.

The use of lawn sands, which are sometimes advertised, for the killing out of weeds, is not recommended as a general rule. Where the lawn is full of inferior types of clover and other small weeds, there is nothing better than a watering with a weak solution of sulphate of iron, used at the rate of about 2 ounces to the gallon of water. Sulphate of ammonia will have a similar effect. These two fertilisers also act as good stimulants to the lawn grasses.

Onion grass, one of the worst of lawn and garden weeds, can only be removed by lifting the sod, and taking out the bulbs of the onion grass. Hand weeding is the only remedy.

CHAPTER IX.

HEDGES.

What is the best plant to grow as a garden hedge, is a question that is very frequently asked. And the answer must be that there is no "best" plant for a hedge. There are dozens of plants that may be used as hedge-plants; and there are many plants that are specially adapted for certain locations, soils, and aspects; also there are many plants grown as hedge-plants that will not thrive under certain conditions. So that it would seem as if it would not be a question of the best hedge-plant, but the best or most suitable plant that would conform to certain local conditions.

And not only will a hedge be required to conform to climatic and soil conditions, but the hedge itself must be considered in relation to the garden and the garden plants. Thus, if a hedge be planted immediately adjacent to a lawn, it will be immaterial whether the hedge-plant be a surface, or a deep-rooting one. But if the garden be planted right up to the hedge, then a shallow and surface-rooting hedge would considerably interfere with the well-being of the garden plants.

Delphiniums and Aquilegias.

Preparation of Soil.

In the preparation of the soil for the reception of a hedge, it must be remembered that the hedge will be a permanency, and that it is to last the lifetime of the owner and of his garden. Further, once the hedge is planted, it is not possible at any time to improve conditions for it, beyond watering and surface-manuring. Thus the soil should be thoroughly trenched to the depth of eighteen inches or two feet, stirring up the clay in the bottom of the hedge area.

If it be possible to include the hedge in the general garden drainage scheme, so much the better, for the hedge will grow better, and thrive better. Most hedges grow satisfactorily when young; but the strain comes when the plants are older, and when their matted and crossed roots have filled and travelled through the soil area in their immediate vicinity. Also, it must be remembered that one never meets in Nature with plants growing under close-planted, massed hedge conditions, except in the richest of soils. And so, the more thorough and the more genuine the preparatory work is, the better will be the growth, and the more enduring will be the hedge.

After trenching, the soil should be enriched with old stable-manure, well mixed with the soil, or with bone-dust, the latter being used more coarse than would be used for ordinary garden work, so that its effects will be more lasting. Also a very small amount of superphosphate may be mixed with the soil in close proximity to the roots of the young plants. This will give them a quick and vigorous start, as soon as the roots move.

Planting the Hedge.

Before planting, a stake should be firmly driven in where each plant is to go, for it is important to stake most hedge-plants: the exceptions will be noted.

Except in the cases of deciduous plants, it will be well that hedge-plants should be purchased as pot-grown plants. For these are not only hardier; but the time of root-disturbance is so short, by the transferring of the plant from the pot to the soil, that, if the transplanting be done carefully, the plant will hardly feel the change.

In removing plants from the pots, the fingers of the left hand should be placed over the top of the pot, with the plant between the fingers. The pot should be turned upside down, and the edge given a sharp tap on the stake, the rail of a fence, a spade driven firmly in the ground, a stone, or any firm based object. The plant will then leave the pot, with the root-system and the soil intact. The roots should then be well loosened before planting, and they should be well distributed in the soil, which has been opened up with a trowel. When the earth is filled in, it should be thoroughly trampled round the plant, care being taken not to break any roots; it should also be firmed in with the thumbs. Then a watering, and tying to the stake where necessary, will complete the work.

The distance at which the various plants may be placed for hedge purposes, depends entirely upon the habit and spread of the species chosen. The preference should be given to closer planting, so that the hedge shall be as compact as possible. It is better to place the plants a foot closer than to attempt to be too economical in numbers or expense. Where the plants are placed too far apart, the hedge does not grow compactly, nor do the limbs intertwine sufficiently to form a compact and interlacing growth, which is necessary, especially in a tall hedge. When too strict an economy has been observed in the matter of plants, and when the hedge grows tall, it does not resist the wind in as even a manner as it might, and thus the individuality of each plant is readily observed, a gap appearing between each one.

A Winter Border of Calla (Richardia) Lilies in front of a young Cypress Hedge.

The widest planting to be observed is with *Cupressus Lambertiana*, the plants of which may be planted from five to six feet apart, and three feet from the fence. *Cupressus torulosa* should be spaced at from twelve to eighteen inches. From nine to twelve inches would be correct for a Privet hedge; while Hawthorns may have a span of eighteen inches. Privets may be planted in double alternate rows, to give a thick strong hedge.

Pittosporum undulatum may be planted eighteen inches to two feet apart, *Pittosporum eugenioides*, from twelve to eighteen inches, and the Coastal Tea-Tree about twelve inches.

The most important point in the building of a hedge is the retention of the growths and the foliage in the lower parts, right down to the ground. This is mainly done, in some cases, by the suppression of the higher growths, by pruning and trimming; but the admission of light to all sides of the hedge is an important factor. Therefore it is well not to plant a hedge too near to a close-built fence, but to keep it some distance away, so that it may be trimmed on the fence side, as well as on the inner side, which is usually more seen and noticed.

Trimming and Pruning.

It must be noted that, as with other plants, hedge-plants all possess an individuality, and that they require management according to their habits of growth. Thus, to induce a Privet hedge to furnish ample growths low down, near the ground, it requires frequent and constant pruning, to make it branch out. But if this treatment were given to a Coprosma or a Cypress hedge, it would be fatal to successful growth. These hedges must be allowed to grow to the full height required, before the top is stopped or pruned. They may then be trimmed, trimming the lower growths from time to time, should they be growing out of bounds.

Hedge-plants.

The choice of a hedge-plant is mainly a matter of individual taste. If a hedge is required so that it will be valued for its flowers, then such plants as the broom, *Cytisus scoparius,* Hawthorns, various Acacias, *Duranta Plumieri,* White Tree Lucerne, Tamarisk, *Grevillea rosmarinifolia,* and many others are very useful. The White Tree Lucerne is an exceedingly quick-growing plant for a hedge, so are the species of Tamarisk; but the White Tree Lucerne soon becomes shabby. Some Acacias are also quick growers; and the best species for hedges, are the lower-growing species, such as *Howittii, retinodes, myrtifolia, sclerophylla, armata,* and others. *Acacia prominens* makes a good hedge, but it is slower growing. *Acacia Baileyana, decurrens* variety *normalis, leprosa* and *longifolia* will give fine tall hedges or breakwinds. Acacias prefer a heavy to a light soil.

Hedge plants that are grown for floral effects, should be pruned immediately after flowering, and at no other time. In the case of hard-wooded plants such as Acacias, the pruning should be done carefully, and the cutting should not be too severe.

For close-growing hedges, the various Cypress species are invaluable. *Cupressus torulosa,* and *C. Lambertiana horizontalis* are the types usually grown. Seedling plants should not be planted, as these show considerable individual variation. Plants from struck cuttings or grafted plants are better and more uniform in growth and foliage. Various golden or yellow forms of Cypress are frequently used for hedges, the Golden Lambert being very beautiful. Privet, both the golden, golden variegated, and green forms, are common hedge-plants. They are very hardy, and are surface-rooting plants. The white flowers are very fragrant.

Several species of Pittosporum are commonly grown, *P. undulatum,* the large-leaved species, being the most common. *P. eugenioides,* a small shining-leaved species, and *P. crassifolium,* a dull-leaved form, make good hedges, but not so permanent as the *undulatum.*

A very fine and compact hedge may be grown from the coastal tea-tree, *Leptospermum laevigatum.* It grows freely, is deep-rooting, and very hardy. The "Moonah," sometimes called "Swamp Tea-Tree," *Melaleuca ericifolia,* a native shrubby tree, makes an excellent hedge, and trims very well indeed.

Mixed hedges are undesirable, they are usually uneven in growth, and the appearance is always unsatisfactory. Only one type or species of plant should be grown, so that evenness and regularity, which are two chief essentials in hedge-growing, may be attained.

The production of hedge-plants is not often undertaken by the amateur grower. When the time required and trouble taken are considered, this is hardly worth while. It is far preferable to procure the plants for the purpose. Such hedge-plants as Tamarisk and Privet may readily be struck from cuttings; but to grow Cypresses from cuttings or grafts is the nurseryman's art. Cypress hedge-plants should never be grown from seed, as these rarely come true to type, and the seedlings show great variation of form and colour shades.

The Tree-Lucerne seed may be sown in the place where the hedge will be, for it is hardy, and germinates readily in the open.

Native plants, such as Acacias, Boobiaylla, the Silver-leaved Satin-wood, *Phebalium Billardierii,* will readily transplant from their native habitat. Osage Orange grows easily from seed; so does the Kai Apple, *Abelia Kaffraria.* This latter plant is very suitable for dry and hot situations, but it is excessively thorny, and almost "boy-proof."

Such European hedge-plants as Holly, Yew, Laurel, should be obtained as well-established plants from a nursery. They always thrive better in a cool or mountainous district.

The small-leaved Japanese Bamboos also make a good hedge, and where tall hedges are required, several Eucalypts, such as the Sugar gum and the Mahogany gum are useful. The boobyalla, *Myoporum insulare,* forms a beautiful shining-leaved hedge: and the Old-man Saltbush, *Atriplex nummularia,* forms a striking and glistening grey or silver bank of foliage, as also does the small-leaved Saltbush, Rhagodia.

Indeed, the plants that may be used for hedge purposes are legion, especially when the infinite variety and hardiness of the Australian flora are considered. The various Eugenias *(Acmena)* and *Pittosporum undulatum* are really trees, growing in rich jungle soil; but they thrive very well as hardy hedge-plants, in dry and exposed situations, showing their adaptiveness to almost any position. Certain berry-plants, such as *Crataegus crenulata,* and *Cotoneaster Simmondsi,* as well as the Berberis family, are good plants for a hedge, and the pruning of these plants will be deferred until they have carried their fruits.

While it is urgent that good and vigorous growth should be aimed at, the main secret of successful hedge production is found in the pruning and training. Every effort should be made to keep the hedge well furnished with young growth and foliage, right down to the ground. This is only attained by constant training, trimming, and pruning. It is natural for all plants to grow upward, and to spread out, and as the upper parts shade the lower ones, these, receiving less light and air, are liable to weaken and die, if they are not so prevented. This can only be prevented by a suppression of the top growths, both outward and upward, so that light and air, as well as nourishment, may be given to the lower parts. When plants such as Cypress, Yew, and Coprosma, are grown, they should be allowed to grow to the full height desired, without suppressing the top or central growths. All lateral growths, however, may be trained, interlaced, or pinched at the tips, so as to attain symmetry during growth. Such plants as Privets, Tea-tree, and White Tree-Lucerne, need constant trimming, so that a compact growth may be obtained from the start. Where strong lateral growths come, in any hedge-plant, these should be intertwined with the growths, so that the hedge may be as compact and rigid as possible.

The annual trimming or clipping of hedges is usually performed in spring and summer, when the growth is vigorous; but if flowers are required, then this operation should be delayed till the flowering time has passed. The hedge should then be at once cut back.

Cocos Yatary.
A fine Ornamental Lawn Palm.

Where a low hedge is required, which will run for a considerable distance, it breaks the low monotony to allow an occasional plant to grow much taller than the rest. These "sentinel" plants may also be trimmed: and the appearance is often a pleasing break in a hedge that would otherwise perhaps have a flat or monotonous appearance.

Constant trimming, so long as the hedge is growing, will strengthen every plant; it will keep each one well furnished to the ground, and it will considerably add to the general strength, as well as to the neatness of the whole.

CHAPTER X.

PLANT-SHEDS AND GLASS-HOUSES.

The Plant-Shed.

Very frequently gardeners wish to have a place for the reception of pot-plants, which are grown, perhaps, for their own sakes, and also possibly for the occasional decoration of the house. Such plant-houses are really necessary if many indoor palms and other plants are grown. Usually these places are called Ferneries, although in many cases the ferns are conspicuous by their absence. Such a type of house, which might be called a plant-shed, could be built as follows:—A six-foot paling-fence should be erected, enclosing the space selected, the palings standing on a 6 or 9 inch red-gum plinth, and the tops of the posts projecting eighteen inches above the top of the fence. Rafters should then be placed from post to post, and if the shed is fairly large several posts would be required inside for support of the middle of the rafters. A door, preferably on the west or south side, should be provided, either of palings or soft wood. Across the roof, which is to be flat, should be stretched double lengths of firm fencing-wire, each section being about 18 inches apart. The roof should be built of thin branches of any plants, preferably pliable tea-tree or bamboo, or both combined. If these are laced through the wires they will be held in place without being fastened in any way. The space between the top of the fence and the tea-tree should then be filled in with two or three two-inch battens, or with fine wire-netting. Thus a comfortable house will be built for the pot-plants, in which they will be protected on all sides from winds and draughts.

This house will admit abundant light from the spaces between the top of the fence and the roof, and also through the roof itself. The disadvantage of lattice, apart from draughts, is that the directness of the sun's rays on a hot day very frequently burns a strip or zone on the whole of the plants in one section of the house. By using tea-tree branches or similar material, the sun's rays never enter in a direct line, the light being broken up and diffused before it reaches the foliage.

Pot-plants of all kinds are very susceptible to draughts, and for this reason a plant-shed built of lattice-work or of old bamboo blinds, or similar material, is to be strongly condemned. Lattice-work may look very beautiful, but an artistic building is not the chief end to be aimed at when constructing a plant-house. If a lattice-house be desired, the inside should be lined with old bagging, jute, hessian, match-board, or preferably with close-fitting timber, which will not allow the wind to enter into the shed. The doors, too, should be close. A plant-shed built with open doors will always be draughty, and that is detrimental to the life and health of the plants.

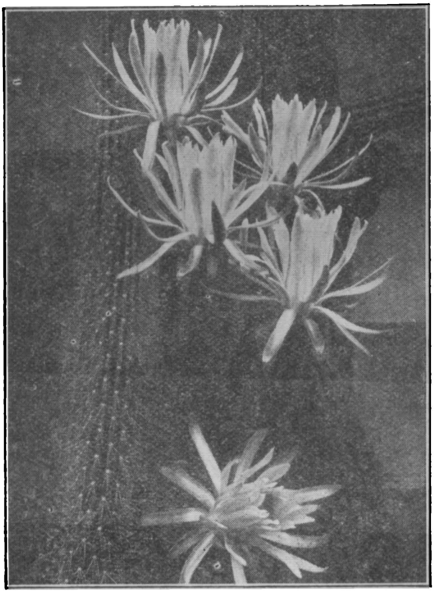
In preparing the interior for the reception of the pot-plants, shelves may be built, or the plants may be stood on raised beds. If shelves are required, it would be well to have them at either end. The beds in which the pot-plants are to be placed should be raised a few inches above the level of the path, so that the water will not lie about, and the paths will act as drains. The beds may be built up with an edging of red-gum or jarrah, the paths being filled up with broken cinders or a mixture of cinders and sand. This provides a drainage medium so that the water will not lie about the pots. It also reduces the growth of weeds about them to a minimum.

The inside walls, and inner supports, if there are any, may be used for planting climbing Asparagus, climbing Ferns, "tree" Begonias, hanging baskets, fern-balls, staghorn or elkhorn-ferns and other plant-shed decorative plants. Thus the shed itself may be made beautiful right through. The outside of the shed may also be used for the training of climbing plants, vines and espalier fruit-trees of all kinds.

A corner of the bush-house may be planned to allow the planting of ferns, either tree-ferns or dwarf varieties. A decorative appearance is thus given to the house, taking away the more formal appearance.

The Green-house.

The combination of a plant-shed and glass-house does not result in the successful growing of plants. Frequently a glass-house may be seen which has glass sides, and lattice or bamboo-blind tops. For all the value that this glass is, it might as well be taken away and timber used in its place. It provides hardly any warmth for the plants, because any heat that is attracted by the glass very soon escapes through the open top. If a combination be desired, it will be far better to have a glass roof, so that the warm air may not so readily escape.



Cereus Cactus.

As, however, it will ultimately escape through the open sides the combination is very rarely a success.

In building a glass-house the size will depend upon the wishes and the purse of the owner, but the position of the house is the more important point to be considered. It should stand right out in the open, free on all sides from the shade of fence, house, or tree, and the door should not face in the direction of the prevalent winds, particularly the north wind, which is hot in summer and cold in winter. Provision should be made for ventilation, preferably at the sides, as the door itself

Phyllo-Cactus (grafted on Cereus).

does not admit of a proper circulation of air when it is required. It is a mistake to build a glass-house too high. A high roof only draws the plants, and gives them a tendency to legginess. The sides of any average glass-house need not be more than 6 feet in height, with the central ridge of the roof 10 or 11 feet. Sometimes the plants will thrive better in a glass-house if they are distributed on shelves built in the form of trays, rather than on open shelves or platforms. The trays may be 2 or 3 inches deep, and should be filled in with sand and charcoal, sea-shells, or some other similar material. This mixture will maintain a certain amount of moisture round about the base of the pots for capillary attraction.

Then, again, the benches may be constructed of jarrah boards, three inches by one inch, and on this the pot-plants may stand. This gives a good circulation of air, especially where such plants as orchids are grown, which need both air and good drainage. Sometimes, for health conditions, and also for the retention of moisture, a close bench is built with charcoal or shells on the top, and having narrow jarrah boards on top of that.

In placing pots on the shelves they may sometimes be placed on inverted pots, to break up the even, level appearance they would present when all placed evenly on the bench.

One important point in glass-house structure is frequently overlooked. The success of plants in the house usually depends on the humidity of the atmosphere. Dry air is not suitable for glass-houses. Thus one will often see tiled or concrete floors, not only along the paths but under the benches as well. Such houses would need hosing or watering down very frequently in the hot weather. Brick flooring is far preferable, using soft bricks so that they will hold moisture. Under the benches, bricks bedded in sand may be laid. If possible, the ordinary soil may be left, planting in it such plants as Ferns, Lycopods, Rex Begonias, and others. By this means a greater humidity will be obtained.

Then there is the question of the glass. A heavier glass will retain the heat much longer than one of a lighter quality. Thus a 24 ounce glass will keep the plants warm for a longer period in the evening than a 16 ounce. The heavier glass will demand, of course, stronger timber structure. This applies whether heating apparatus is used or not.

The usual heating apparatus is in the form of a coke boiler built outside the house, which heats the water, causing it to circulate when hot, through pipes under the benches.

Lastly, much stress must be laid on the individuality of the glass-house. No two houses are alike, and the owner must study conditions, both external and internal, until he knows exactly how to water, to ventilate, and to shade.

It is not wise to paint the glass of the glass-house, unless it be in a warm climate and in a very sunny situation. A good substantial white-washing may be given to the outside of the glass in spring-time. This will shade the plants, and it may be necessary to repeat it in mid-summer. The white-wash will probably be gradually removed by stress of weather in autumn, so that abundant light will reach the plants through the duller days of winter.

It will be necessary to provide extra shade for the roof of the glass-house, and this can be readily done by having frames built of light wood, the lattice being made of ½-inch or ¾-inch laths tacked a lath-width apart. This will last for quite a number of years. A temporary expedient would be to provide bamboo-blinds, which, however, very soon wear out. A blind made of hessian would last only one season, and would need to be replaced each year. Patent lattice clips for making lattice can also be purchased.

The Verandah Fernery.

If pot-plants are grown on verandahs, passageways between the house and the fence, and other similar situations, very little success need be expected, if there is a regular draught or current of air. Such places are usually shady, and are frequently chosen for the reception of tree-ferns in tubs. These plants, however, when so treated, do not thrive, partly because of the draught and partly because tubs do not provide nearly sufficient space for their big root-system. They thrive best when planted in the ground. Indeed, a so-called Fernery might be described as a place in which ferns should not be grown. Almost any of the hardy ferns, including tree-ferns, will thrive far better right out in the open garden, provided they are given a southern aspect, and protected from the north and east winds. A collection of tree and other ferns, with protection thus afforded, makes a very decorative section in any garden.

CHAPTER XI.

THE ROCK GARDEN AND ROCKERY.

The "Rock" garden in Australia is quite a different proposition to the rock garden in the Northern hemisphere. In the north, rock gardens are usually the home of alpine plants, or plants of a small herbaceous habit. They are usually miniature alpine hills and morraines. And there we see such plants as Saxifrage, Campanula, Anemone, Primula, Gentian, Dianthus, Arabis, and others—all plants of cool and mountainous districts.

Rock Cactus.

Such gardens are hardly possible under our warm and often hot climates. In our mountain homes, and in Tasmania, alpine rock gardens would be suitable, and occasionally such gardens are met with, but they are few and far between. The moist conditions, both of air and soil, as well as a cool, mountain atmosphere, are conditions rarely met with, but very necessary for these plants.

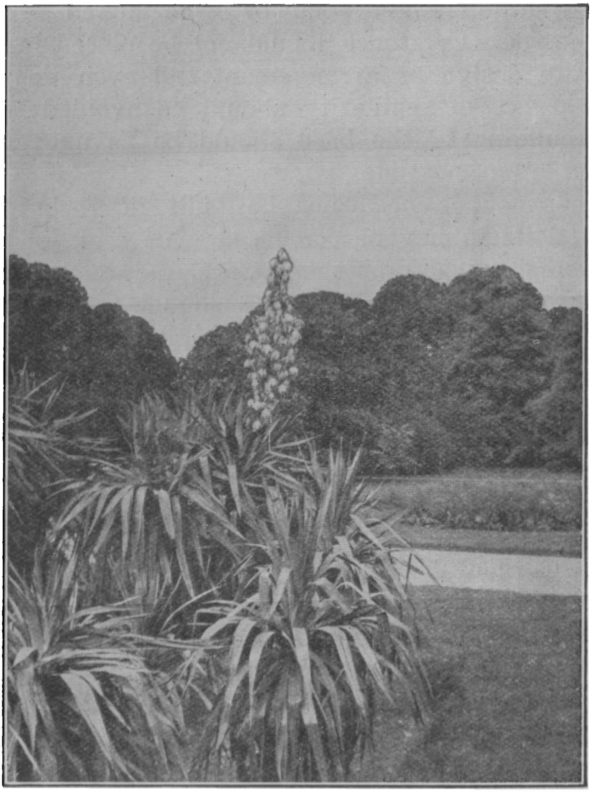
An Australian Rock Garden.

But we can still have rock gardens, where quite a different type of plants is grown. Instead of simulating an alpine rock garden, we construct a miniature dry country rock garden; and we plant Aquilegias, Violas, Saxifrages, Thalictrum Saponaria, Catananche, and similar plants in suitable positions, usually cool and shaded, in the ordinary garden beds.

Our rock gardens, or "rockeries," are furnished with Cactus, Echinocactus, Phyllocactus, Euphorbia, Echeveria, Sedum, Cotyledon, Rochea, Mesembrianthemum, and other succulents: on the higher portions we plant Yuccas, Dracaenas, Aloes and Opuntias; while lower down we plant dwarf hardy shrubs, strong growing bulbous and similar plants, such as Crinum, Kniphofia, and Strelitzia; while occasionally hardy dwarf and tree ferns are planted on the sheltered sides.

Occasionally Tradescantia, Nasturtium, Polygonium, and other trailing plants are grown, to cover certain parts of the stones, but these should be used with care, for trailing plants are apt to take possession of the rockwork, and to smother the less assertive succulents. On high rockworks, plants of Wichuriana roses may be allowed to trail down; *Asparagus Sprengeri,* with its decorative foliage and scarlet seeds; *Forsythia suspensa* and *Jasminum primulinum,* with their yellow flowers; and Eriocephalus, with white flowers, droop over in a decorative fashion; while some suitable dwarf shrubs would be, the dwarf Pomegranite, *Berbeirs Wilsoni* and *B. Darwinii,* Margyricarpus, with its small white fruits, Cistus, the Rock Rose, dwarf Deutzias, Zonale Pelargoniums, Cuphea, Ochna, Felicia, and others.

The irregularity of a rock work structure or mound is one of its charms; the rocks being arranged so that they appear as seen naturally on the hill and mountain sides. It almost goes without saying that such rockmounds should be built of one class of stone. That is, the mound should be



Yuccas on Edge of Rockwork.

all basalt or all sandstone, but not of basalt and sandstone mixed. The natural shape of stone, the natural positions,—indeed everything should be so arranged as to have the appearance of a natural hill, whether it be a small or large mound.

The rocks or stones should not be placed in any definite design or arrangement; all even lines or appearance of regularity should be avoided; even the building of the base should be as uneven or irregular as possible.

The mounds need not be built of rocks; the mound itself may be composed wholly of soil, the rocks being placed on the surface, and, held in position by soil. Arrangements should be made for drainage: and where less hardy plants are grown, a water supply or a spray on the rock mound is imperative.

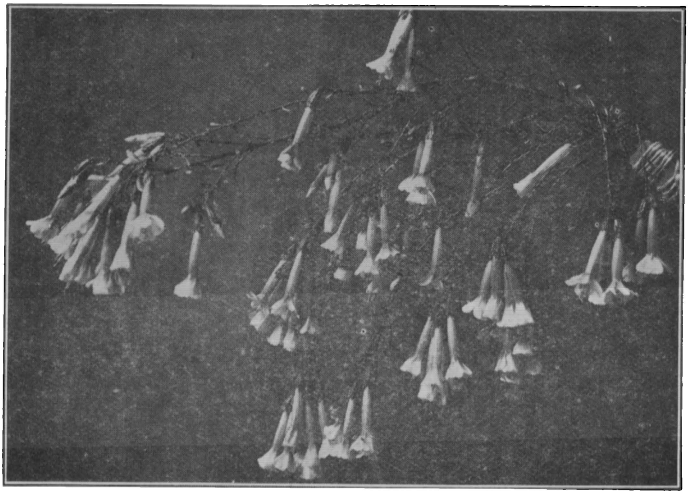
CHAPTER XII.

SHRUBS FOR THE GARDEN.

In Garden Planning, apart from the hedge and the lawn, which are classed as permanent features of the garden, the garden beds and sections themselves carry two features which may be classed as temporary and permanent. The temporary features of a garden include bulbs, annuals, herbaceous and similar plants. The permanent features comprise trees, climbers and shrubs. Roses, of course, are shrubs, but they occupy a class by themselves.

A garden without shrubs is rather a poor type of a garden, and seems to have no character of permanency about it. The shrubs form the main setting; indeed, they are the foundation or the background, which may act as a foil to the smaller and more temporary plants; but which may, and should, in themselves have character, distinction and beauty.

The judicious planting then of shrubs to suit each location is an important feature in garden planting; and considering the wealth and variety of beautiful shrubs available, the task of selection is surely an easy one.



Cantua dependens.

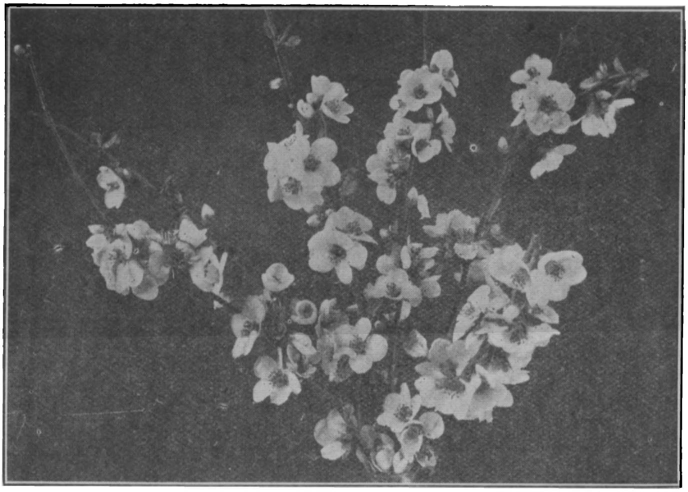
There are coloured foliage shrubs, such as *Prunus pissardi*, the purple foliage plum, and all its relations; the silver Salt bushes and the grey Lavender, the variegated Euonymus, Pittosporum, Maple, Coprosma, and others. These, and others, tone up the garden considerably, and lift it away from the dull green of the usual vegetation.

Then there are the wonderful flowering shrubs, and here the choice is unlimited. Red, yellow, blue, or white flowers; evergreen and deciduous; spring, summer and autumn blooming; tall and dwarf, or only medium; fragrant shrubs, long season flowering shrubs! There seems to be no end to them.

The judicious planting of shrubs, intermingling the deciduous and evergreen, so that there shall be neither a mass of foliage without relief, nor a patch of winter bareness unbuilt with supporting leaf variety, is the important work of planting. Shrubs must be placed so that the tall shall not hide the dwarf, so that the colours shall not clash when adjacent plants are flowering at the same time, and so that they shall harmonise also with the roses and climbers and other plants.

Among deciduous shrubs the Japanese Magnolias must be mentioned. Flowering in spring time, and before the foliage comes, they are masses of glorious beauty almost unequalled. They are a hardy race, of many species, and easy of growth. While somewhat slow growing, they finally reach a large size. A deciduous shrub from Japan, flowering in winter time is *Chimonanthus fragrans.* It is really Japanese in appearance, with its stiff twiggy stems carrying the yellowish bell shaped flowers, purplish inside, all very formal; but the sweet fragrance is very rich, and it well deserves the name of Allspice bush.

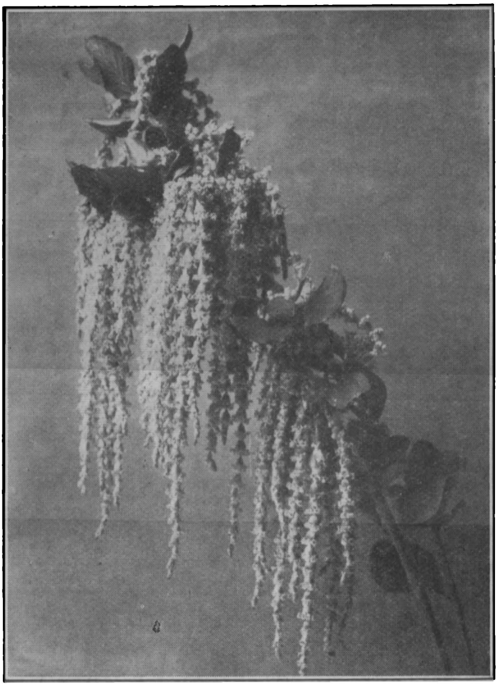
The brilliant Japanese quince, *Cydonia japonica,* often called by the latter species name, is one of those ever popular flowering shrubs. The masses of scarlet flowers that come in spring, are very gay. There are also pink and white varieties.



Japanese Quince.
Cydonia (Pyrus) Japonica.

The "necklace flower" from California, *Garrya elliptica,* is one of our quaint evergreen shrubs. The roundish leaves are a dull green, and the long tassels of flowers that hang down from the branches in winter are grey green, giving a most unusual combination—a typical winter shrub, beautiful and unique.

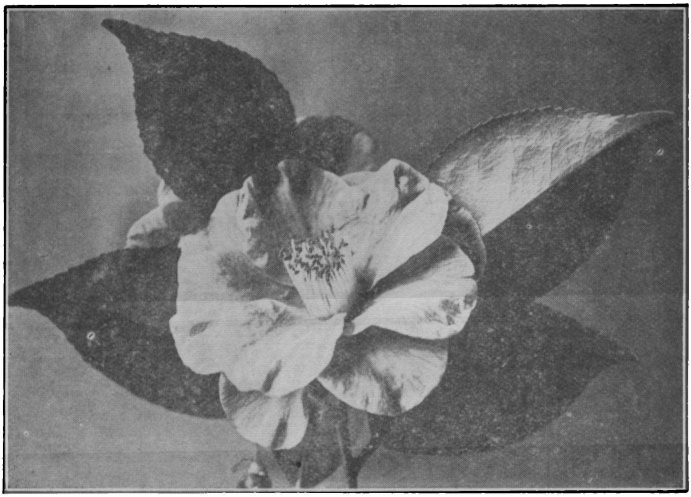
Cantua dependens has been suggested as suitable for a rockwork, but it suits the shrub border as well. It loves a well drained rocky soil, coming from the Andes in Peru. The pale red bells, a couple of inches long, hang in bunches from the light foliaged bush, for some weeks in summer-time.



Garrya elliptica.

The Camellias, with their glossy evergreen foliage, are excellent subjects for giving gay patches in winter time. One variety, which is quite away from the usual type, is the large bright red single flowered form called "The Czar," with flowers from five to six inches across, and a decorative upright bundle of pinkish and yellow stamens in the centre.

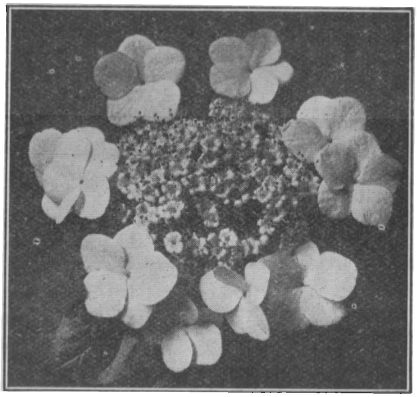
A closely related shrub, and one unfortunately not often seen is *Gordonia anomala.* It is like an open single white Camellia, flowering in winter. Perhaps the reason why these and similar plants are not frequently seen, is the fact that they are surface rooting, and so resent spade cultivation, and that they are both lime haters.



Single Camellia ("The Czar").

Then there is the genus Viburnum, of which the Guelder Rose is a member. Some forms are evergreen, some are deciduous. Some of the species, notably *V. opulus sterilis,* the Guelder Rose, has beautiful autumn tints in the leaves before they fall in winter. *V. macrocephalum,* the large headed Guelder Rose, has even larger heads of white balls than the former, the flowers lasting for many weeks. The "single" or "wild" form of this latter species, known as Keteleeri, is quite a unique flower. The centre is a mass of small white flowers, similar to those of the Lauristina; and surrounding this is a number of large hydrangea-like blooms. Usually these forms of Viburnum are somewhat slow growing, but they repay.

Even mentioning these very few garden shrubs, it will be seen that the skilful placing of these in the garden is an important feature in garden planting.



Guelder Rose.
(Viburnum macrocephalum Keteleeri).

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